

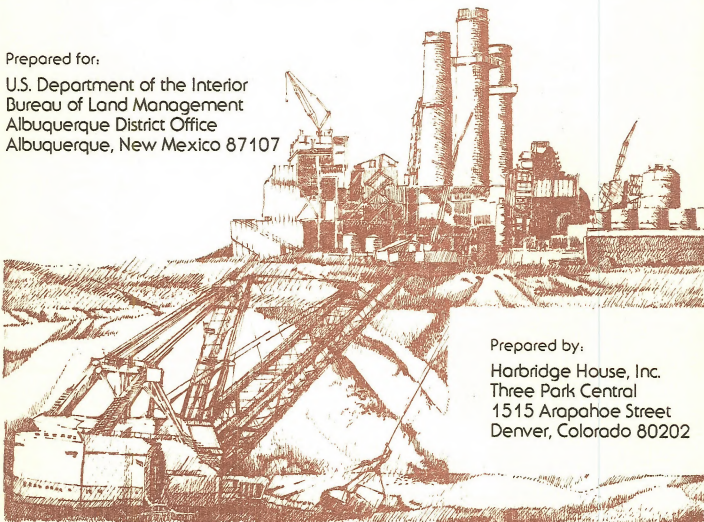


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# SOCIOECONOMIC COMPONENT NORTHWESTERN NEW MEXICO COAL DEVELOPMENT ENVIRONMENTAL STATEMENT

Prepared for:

U.S. Department of the Interior  
Bureau of Land Management  
Albuquerque District Office  
Albuquerque, New Mexico 87107



Prepared by:

Harbridge House, Inc.  
Three Park Central  
1515 Arapahoe Street  
Denver, Colorado 80202



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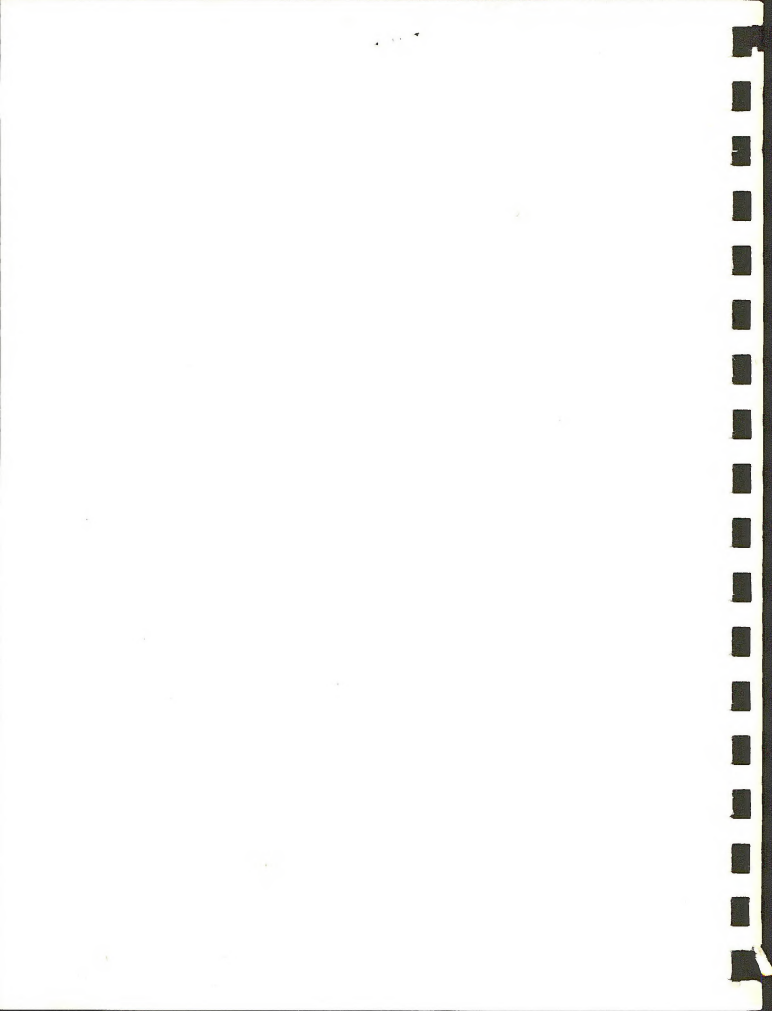
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29 September 1978

Mr. William Sharp, ES Team Leader  
U.S. Department of the Interior  
Bureau of Land Management  
Albuquerque District Office  
3550 Pan American Highway, NE  
P.O. Box 6770  
Santa Fe, New Mexico 87501

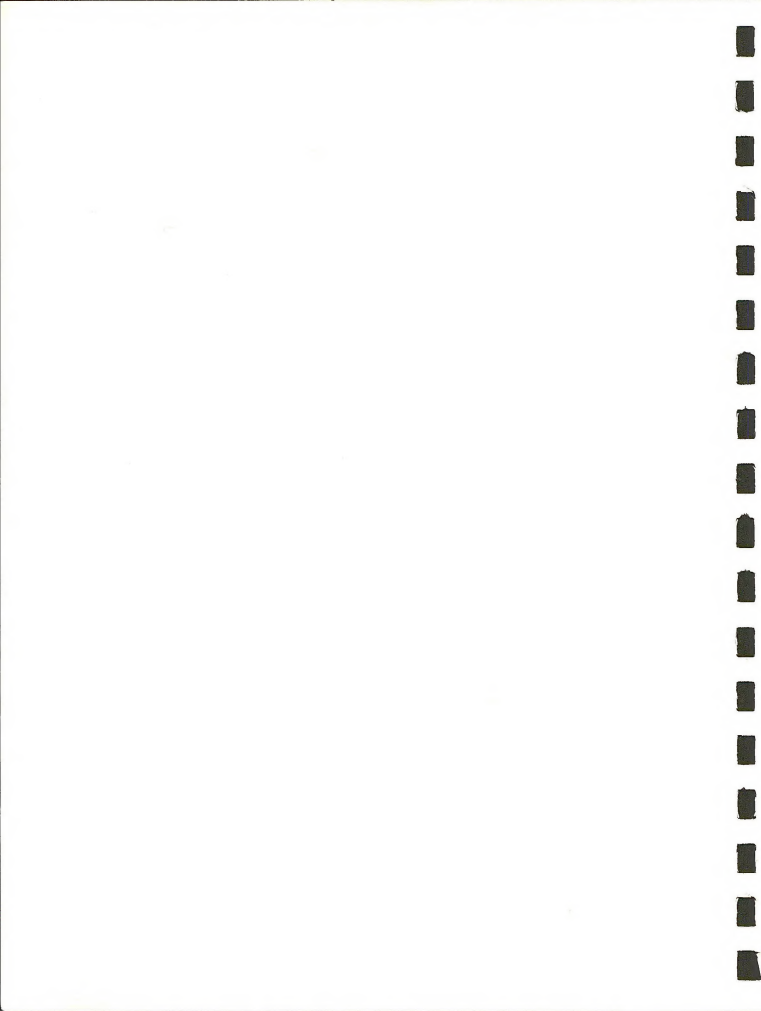
Dear Mr. Sharp,

Harbridge House is pleased to submit this final version of the Socioeconomic Component of the Northwestern New Mexico Coal Environmental Statement to the Bureau of Land Management. We have attempted to respond to all comments on previous drafts, and to insure that this document will adequately support the total environmental statement. We are, of course, prepared to respond to future inquiries regarding our work which arise out of the review process.

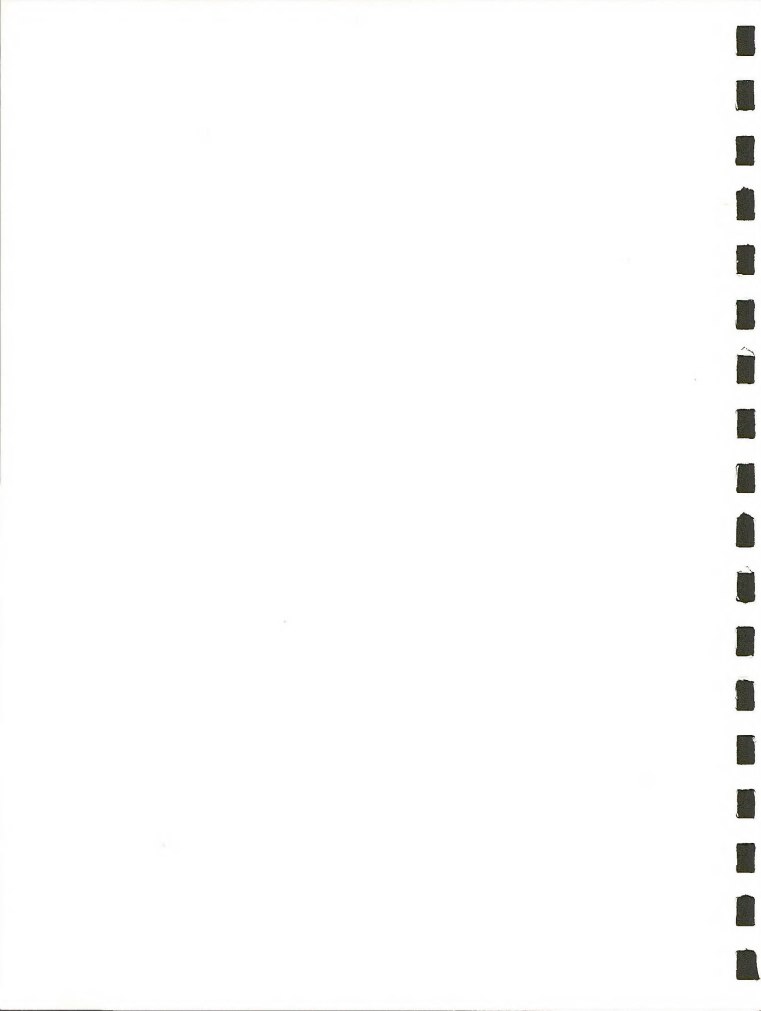
Let me express my thanks to all of those persons in the Bureau of Land Management who assisted us in our work, particularly Mr. Teodoro Rael of the New Mexico State Office and Mr. George Byers, formerly of your office. I hope that Harbridge House will have another opportunity of working with the Albuquerque District either by preparing similar environmental studies or by participating in planning efforts.

Sincerely,

Thomas C. Ward  
Project Director



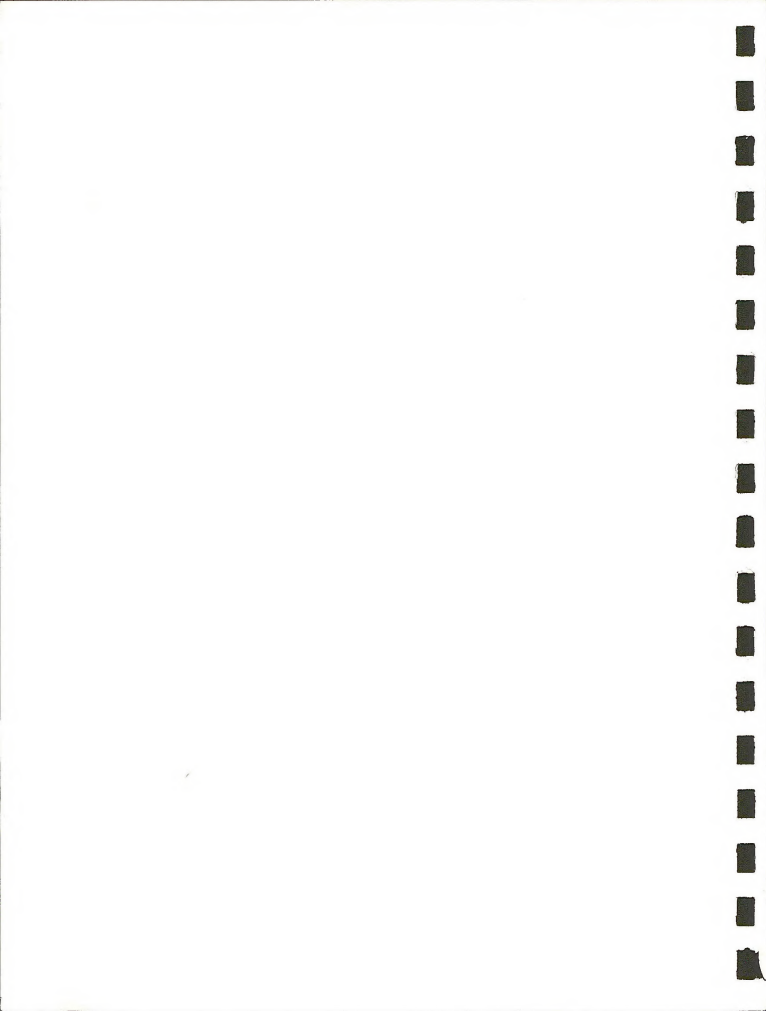
REGIONAL ANALYSIS



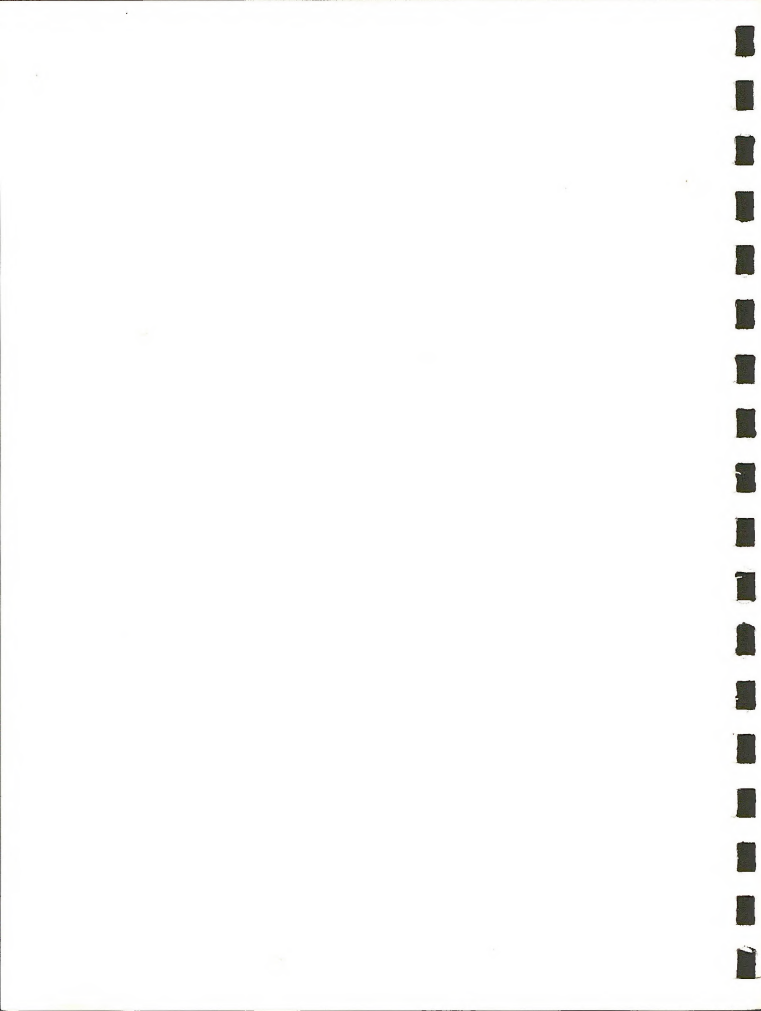


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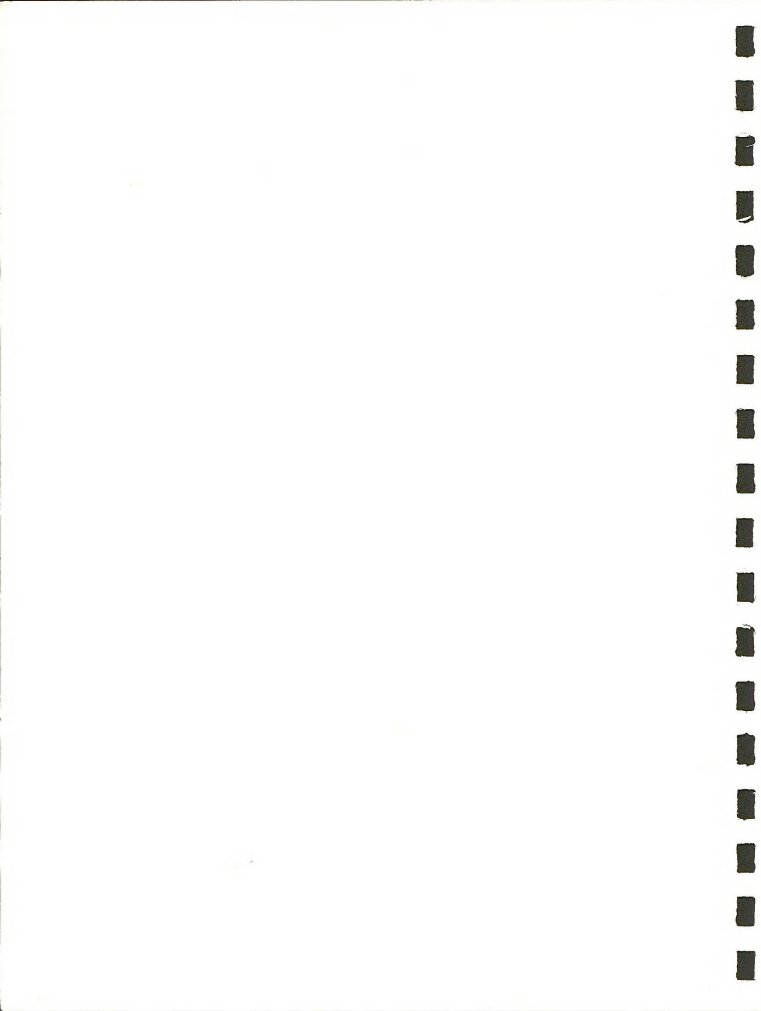


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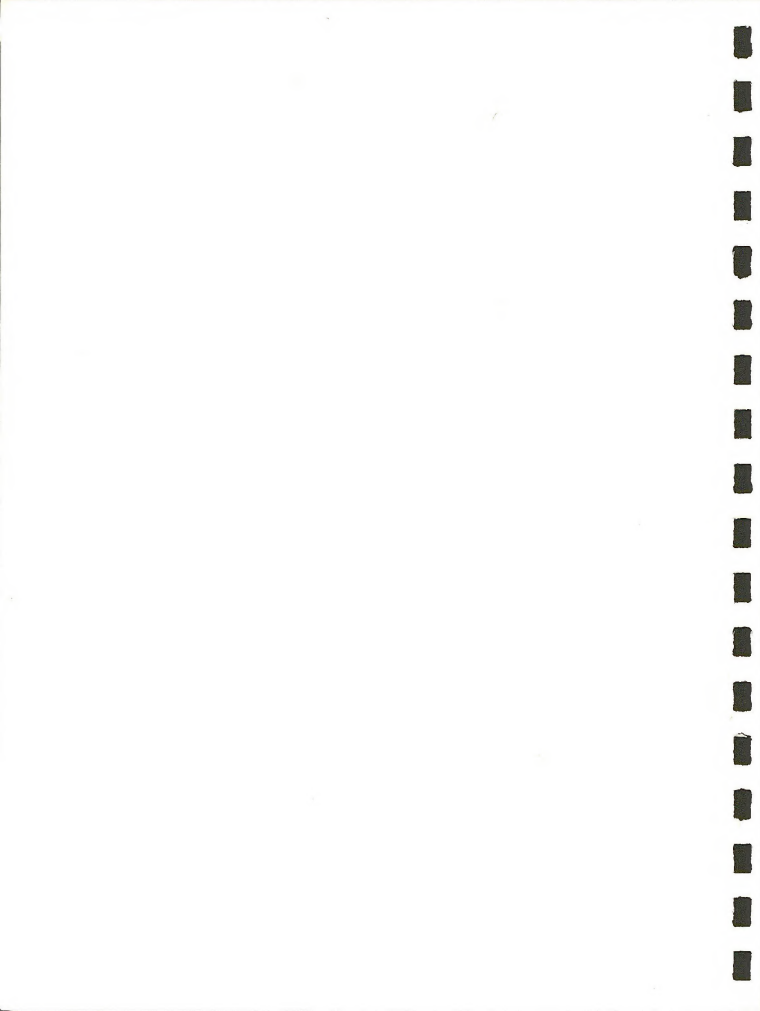
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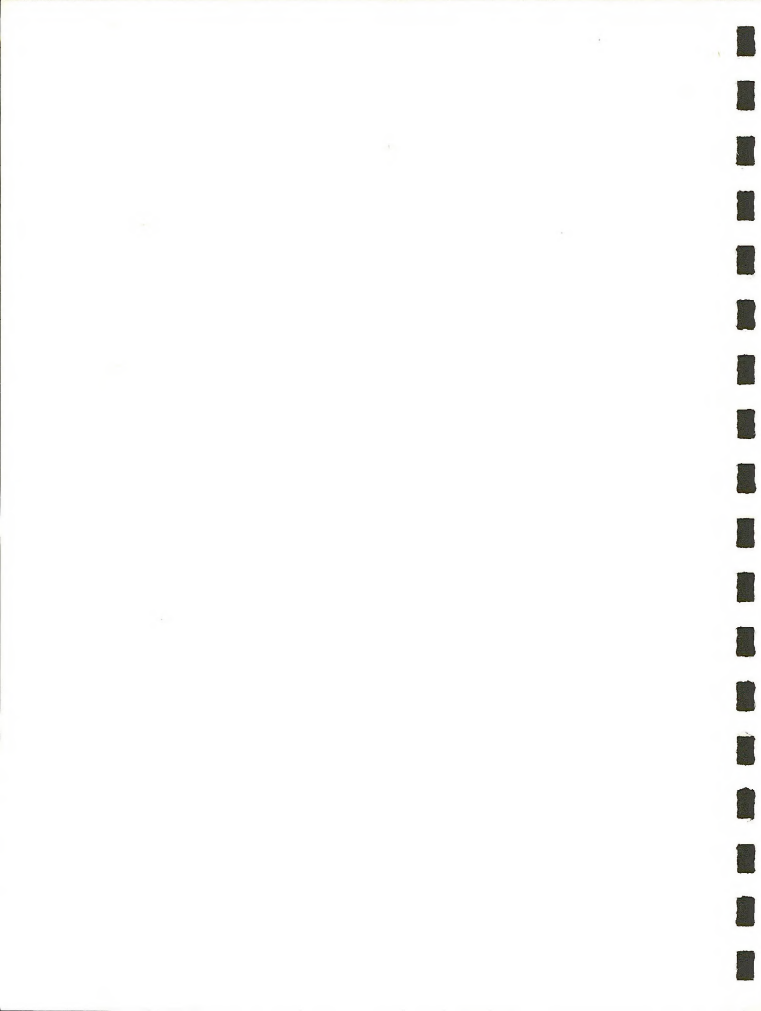
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CHAPTER 1

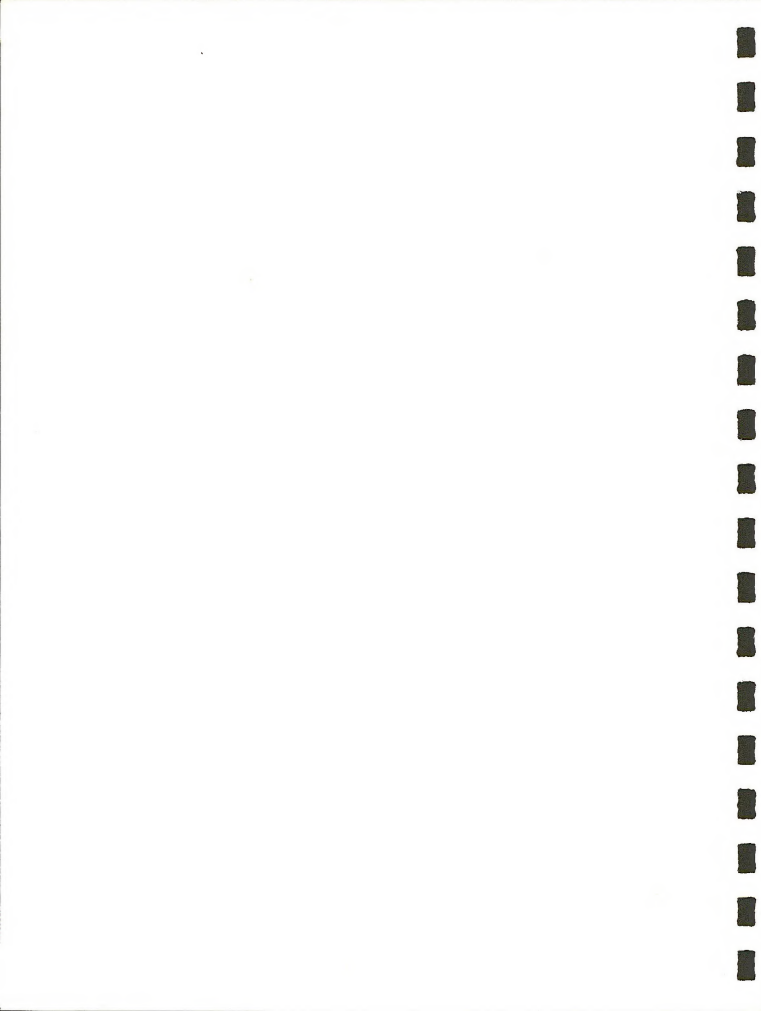
DESCRIPTION OF PROPOSED ACTIONS



## CHAPTER 1

### A DESCRIPTION OF PROPOSED ACTIONS

The first chapter of the Environmental Statement, which contains a description of proposed actions, is being prepared by the U.S. Bureau of Land Management, Albuquerque District Office.

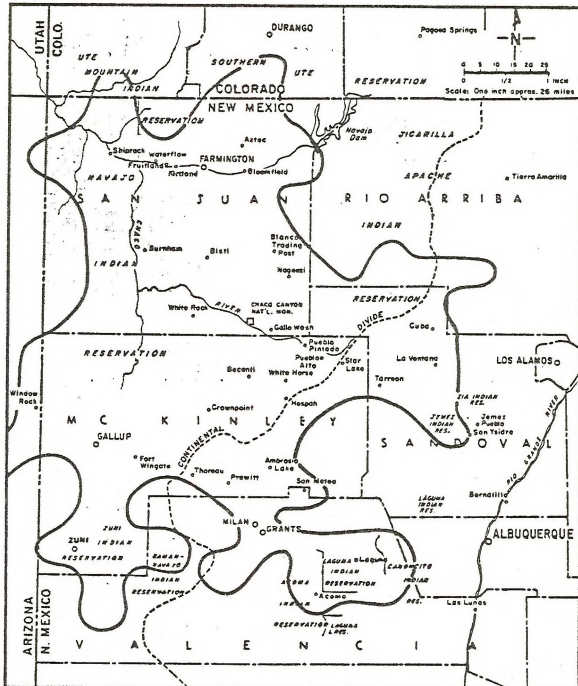


CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

FIGURE 2-1

75 MILE DRIVING DISTANCE FROM PROPOSED DEVELOPMENTS



Line Indicates 75-mile driving distance from sites



## CHAPTER II

### DESCRIPTION OF THE ENVIRONMENT

#### SOCIOECONOMIC CONDITIONS

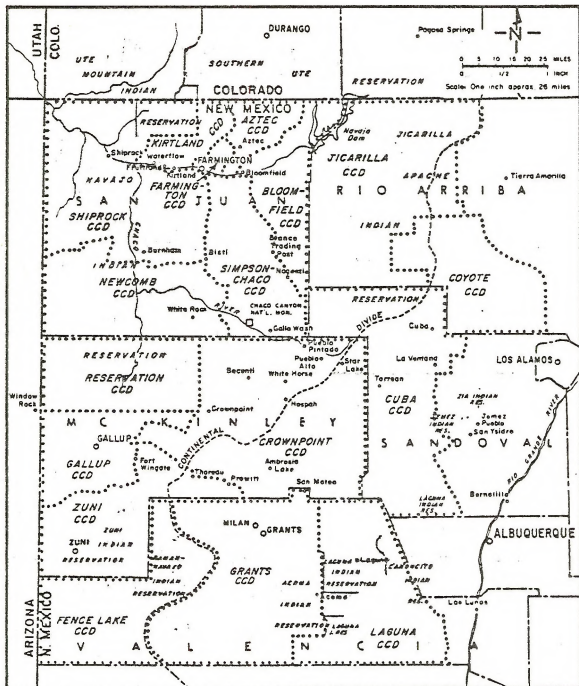
Coal and coal-related developments proposed for public lands in northwestern New Mexico would occur in an existing environment of economic growth and social change. Projects would be located in a sparsely populated, semi-desert region long isolated from the rest of the state and the nation. Most of northwestern New Mexico still consists of self-contained economic and social communities, largely independent of the rest of the state (Eastman and Romanek, 1975). As in other parts of New Mexico, three cultures exist in the region: Anglo, Hispano, and Indian. Each has been relatively successful in preserving its distinctive values, beliefs and life-styles, aided by barriers of language; distance; and special jurisdictions such as Indian reservations and land grants.

However, the traditional balance between the region's three cultures and its historic isolation from outside influences are threatened by development of mineral resources now occurring in the area. The opening of coal and uranium mines on private, state, and Indian lands, as well as the construction of power plants, railroads, and related facilities, are stimulating rapid economic growth. The creation of new jobs results in the immigration of new residents, chiefly Anglos, in response to actual or apparent employment opportunities. In the process, populations of formerly small towns rise, sizes of local payrolls grow, and demands on community facilities and services increase. At the same time, the values, beliefs and life-styles of native Anglos, Hispanos and Indians are challenged by those of immigrants and by the problems of the growth with which immigration is associated.

In this socioeconomic analysis, the ES Region has been defined by proximity to the proposed actions outlined in Chapter I. A commuter driving time of 1.5 hours, figured as a highway driving distance of 75 miles, has been used to delimit the boundaries of this region. Figure 2-1 plots a 75-mile highway driving distance from sites of proposed actions. Communities within this distance of 75 miles would be most likely to experience significant impacts from projects, based on reported commuting patterns of area residents (Carruthers, et al., 1973; U.S. Senate, 1977). A detailed explanation of this definition of the study region is given in the Technical Appendix. As shown in Figure 2-1, all of McKinley and San Juan Counties, the western two-thirds of Valencia County, and portions of Rio Arriba and Sandoval Counties are included in the ES Region.

FIGURE 2-2

CENSUS COUNTY DIVISIONS IN FIVE COUNTY AREA  
AND ES REGION



..... Line indicates border of Census County Divisions

This area comprises all those parts of northwestern New Mexico which are already experiencing impacts from energy resource development on private, state, and Indian lands. Excluded from the ES Region are the portions of Rio Arriba, Sandoval and Valencia Counties which lie along the Rio Grande in proximity to Albuquerque or Santa Fe. Because most economic and some demographic data are only available at the county level, reference has occasionally been made to a five-county area which comprises all of McKinley, Rio Arriba, Sandoval, San Juan, and Valencia Counties. However, whenever more specific information has been obtained, as in the analysis of community infrastructure and cultural values, beliefs, and life-styles, reference has been to the ES Region as defined above. For purposes of comparison, Figure 2-2 indicates the limits of the five-county area and the ES Region.

#### DEMOGRAPHIC FEATURES

The 1977 estimated population of McKinley, Rio Arriba, Sandoval, San Juan, and Valencia Counties was 229,1000. This total represented a nearly three percent gain over 1976, when the five-county area had an estimated population of 223,200 (U.S. Department of Commerce, Bureau of the Census, 1977). Of this total number of inhabitants in 1977, an estimated 71 percent, or 162,350 persons lived inside the ES Region. Thus the area within a 75-mile highway driving distance of proposed actions had a 1977 population which was approximately three-fourths that of the five counties as a whole. Table 2-1 gives the number of inhabitants of McKinley, Rio Arriba, Sandoval, San Juan, and Valencia Counties in the period, 1950-1977. Table 2-2 estimates the number of residents of the region within 75 miles of the sites for the same years. In Rio Arriba County, only the Coyote and Jicarilla Census County Divisions (CCD's) have been counted as part of the ES Region; in Sandoval, only the Cuba CCD; and in Valencia County only the Fence Lake, Grants, and Laguna CCD's.

The populations of four of the five counties shown in Table 2-1 have grown significantly since 1950. By far the greatest gains have been registered in San Juan County, which was the most populous county in northwestern New Mexico in 1977. The total number of inhabitants in San Juan County grew by more than 270 percent in the 27 years after 1950. Throughout the region, population growth rates have varied widely from year to year. In the 1950's, most areas experienced pronounced growth; during that decade, for example, the number of residents of San Juan County tripled. The 1960's saw comparatively small gains in regional population; San Juan County actually lost inhabitants. The 1970's have brought a return to large-scale population increases, particularly in McKinley and San Juan Counties. This alternation of growth and stagnation, the so-called "boom-bust cycle," reflects the alternate expansion and contraction of the regional economy, principally as a result of changing demand and supply functions for northwestern New Mexico's mineral resources.

TABLE 2-1

County	NUMBER OF INHABITANTS, FIVE-COUNTY AREA, 1950-1977						
	1950 <sup>a</sup>	1950-1960	1960 <sup>a</sup>	1960-1970	1970 <sup>a</sup>	1970-1977	1977 <sup>b</sup>
	<u>Population</u>	<u>Annual Growth Rate</u>	<u>Population</u>	<u>Annual Growth Rate</u>	<u>Population</u>	<u>Annual Growth Rate</u>	<u>Population</u>
McKinley	27,451	3.09	37,209	1.51	43,208	4.30	58,000
Rio Arriba	24,997	(0.33)	24,193	0.40	25,170	1.59	28,100
Sandoval	12,438	1.33	14,201	2.11	17,492	4.87	24,400
San Juan	18,292	11.29	53,306	(0.15)	52,517	3.91	68,700
Valencia	22,481	5.69	39,085	0.37	40,539	3.01	49,900
Five Counties	105,659	4.75	167,994	0.63	178,926	3.59	229,100

Sources: <sup>a</sup> U.S. Department of Commerce, Bureau of the Census, Census of Population: 1950-1970, Characteristics of the Population: New Mexico, 1952, 1962, and 1973.

<sup>b</sup> Harbridge House, Inc., estimates on the basis of U.S. Department of Commerce, Bureau of the Census, Federal-State Cooperative Program for Population Estimates, Population Estimates, 1977.

TABLE 2-2

County or Portion of County	NUMBER OF INHABITANTS, ES REGION, 1950-1977						
	1950 <sup>d</sup>	Percent of County	1960 <sup>a</sup>	Percent of County	1970 <sup>e</sup>	Percent of County	1977 <sup>f</sup>
	<u>Population</u>	<u>Population</u>	<u>Population</u>	<u>Population</u>	<u>Population</u>	<u>Population</u>	<u>Population</u>
McKinley	27,451	100.0	37,209	100.0	43,208	100.0	58,000
Rio Arriba-Western <sup>a</sup>	4,100	16.5	4,031	16.7	4,226	16.8	4,650
Sandoval-Western <sup>b</sup>	2,900	23.3	3,255	22.9	2,847	16.3	3,600
San Juan	18,292	100.0	53,306	100.0	52,517	100.0	68,700
Valencia-Western <sup>c</sup>	5,025	22.4	22,939	58.7	20,088	49.6	27,400
ES Region	57,768	54.8	120,740	71.9	122,886	68.7	162,350

Notes: <sup>a</sup> comprises Coyote and Jicarilla Census county divisions.

<sup>b</sup> comprises Cuba Census county division.

<sup>c</sup> comprises Fence Lake, Grants, and Laguna Census county divisions.

Sources: <sup>d</sup> Harbridge House, Inc., 1978, estimated on the basis of information of U.S. Department of Commerce, Bureau of the Census; Census returns were not reported for county divisions prior to 1960.

<sup>e</sup> U.S. Department of Commerce, Bureau of the Census, Census of Population: 1950, 1960, and 1970, Characteristics of the Population: New Mexico, 1952, 1962, and 1973.

<sup>f</sup> Harbridge House, Inc., estimates on the basis of U.S. Department of the Commerce, Bureau of the Census, Federal-State Cooperative Program for Population Estimates; Population Estimates, 1977.

Despite increases in population since 1950, both the five-county area and the ES Region are still sparsely populated, and population densities are low. The average for McKinley, Rio Arriba, Sandoval, San Juan, and Valencia Counties is approximately 8.8 persons per square mile, slightly less than the average for New Mexico, and far below the national average of 60 persons per square mile. Table 2-3 shows population densities, by county. The population of northwestern New Mexico is preponderantly rural. In 1977, an estimated 59.6 percent of the inhabitants of the ES Region lived in rural areas, many Indians persisting in the pastoral life-styles of their ancestors obtaining bare subsistence from the herds they move across the desert range. The urban and rural percentages of county populations are given in Table 2-4. As may be seen, the county with the largest number of inhabitants -- San Juan -- is also the most urban.

There are few cities and villages in the ES Region. As shown in Table 2-5, only nine communities had more than 1,000 inhabitants in 1977. Gallup in McKinley County was historically the largest of these, growing up around a station on the transcontinental Atlantic & Pacific Railroad. The city prospered as a mining center, a rail shipping point, and a market (or so-called "border") town for Navajo and Zuni Indians from nearby reservations. By 1900, it had surpassed in size the Zuni Pueblo located 43 miles south, whose 1977 estimated population of 4,200 was approximately the same as was reported by Coronado in 1540 (McKinley Area Council of Governments, 1977a). Since 1960, Gallup has been replaced by Farmington as the largest city in northwestern New Mexico. Gallup remains an important administrative and commercial center for McKinley County and nearby portions of Arizona (Eastman and Romanek, 1975).

San Juan County possesses three major communities: Aztec, Bloomfield and Farmington. They form an urbanizing triangle near the confluence of the Animas and San Juan Rivers. This area was settled by Mormon farmers who developed the bottomlands along the two rivers with irrigation systems in the late nineteenth century. Their settlements remained Mormon and agricultural until the 1950's when Farmington became a focal point of oil and gas exploration. The city's population increased by 654 percent in that decade, from 3,637 to 23,786 persons. After oil and gas production peaked in the 1960's, growth slowed and there was a net migration from the area. However, the more recent development of coal-fired power plants like the Four Corners and San Juan Generating Stations, and of nearby coal mines, has prompted new population increases (San Juan County Planning Department, 1977).

Economic development in the Aztec-Bloomfield-Farmington triangle has apparently prompted a migration of Navajo Indians from western chapters of the Navajo Indian Reservation to the Reservation's eastern districts, and the off-reservation areas of the Eastern Navajo Agency. The unincorporated community of Shiprock, 30 miles west of Farmington in the valley of the San Juan River, has become the largest town on the 25,000 square mile Navajo Indian Reservation (U.S. Department of the Interior,

TABLE 2-3

POPULATION DENSITIES, FIVE-COUNTY AREA, 1977

<u>County</u>	1977 <u>Land Area</u> <sup>a</sup> (in square miles)	1977 <u>Population</u> <sup>b</sup> (in number of persons)	1977 <u>Population Density</u> (in persons per square mile)
McKinley	5,454	58,000	10.6
Rio Arriba	5,843	28,100	4.8
Sandoval	3,714	24,400	6.6
San Juan	5,500	68,700	12.5
Valencia	5,656	49,900	8.8
Five Counties	26,167	229,100	8.8

Sources: <sup>a</sup> University of New Mexico, Bureau of Business and Economic Research, New Mexico Statistical Abstract, 1977.

<sup>b</sup> Harbridge House, Inc., estimates on basis of U.S. Department of Commerce, Bureau of the Census, Federal-State Cooperative Program for Population Estimates, Population Estimates, 1977.

TABLE 2-4

URBAN-RURAL POPULATION DISTRIBUTION, FIVE-COUNTY AREA, 1977

<u>County</u>	<u>Urban Population</u>	<u>Percent of County Total</u>	<u>Rural Population</u>	<u>Percent of County Total</u>	<u>Total Population</u>	<u>Percent of County Total</u>
McKinley	26,100	45.0	31,900	55.0	58,000	100.0
Rio Arriba	5,600	19.9	22,500	80.1	28,100	100.0
Sandoval	0	0.0	24,400	100.0	24,400	100.0
San Juan	41,900	61.0	26,800	39.0	68,700	100.0
Valencia	18,900	37.9	31,000	62.1	49,900	100.0
Five Counties	92,500	40.4	136,600	59.6	229,100	100.0

Source: Harbridge House, Inc., 1978, utilizing definitions of, and information from, the U.S. Department of Commerce, Bureau of the Census.



Bureau of Indian Affairs, 1977). In 1976, the community of Shiprock was estimated to have 5,200 inhabitants, while the Shiprock chapter, which includes camps in adjacent rural areas, had a reported 7,006 residents (Zickefoose, 1975; Bureau of Indian Affairs, 1977a). By 1977, the population of Shiprock was approximately 5,500.

The twin communities of Grants and Milan, in Valencia County, together constitute the third largest urban center in the ES Region after Farmington and Gallup. Both grew substantially in the 1950's, with development of extensive uranium deposits around the slopes of Mount Taylor. The number of residents of the City of Grants rose by 351 percent between 1950 and 1960; it was in the same decade that the Village of Milan was first incorporated. The 1960's were characterized by comparatively slow growth, but between 1970 and 1976 the size of Grants/Milan increased by almost 5 percent annually. In addition, unincorporated areas adjacent to the two municipalities, such as San Mateo and San Rafael, were the sites of subdivision and settlement (Middle Rio Grande Council of Governments, 1977).

Minerals resource development in the ES Region has resulted in the emergence of several new population centers. The most important of these communities is Crownpoint, in McKinley County, with 3,500 residents in 1977 and an additional 2,200 inhabitants when BIA boarding schools are in session. For many years the headquarters of the Eastern Navajo Agency of the Bureau of Indian Affairs, and the trade center for the 12,000 Navajo who live in northern McKinley County, Crownpoint has grown recently with uranium mine investment in the vicinity. Similarly, Prewitt and Thoreau, two small communities located south of Crownpoint along Interstate Highway 40 between Gallup and Grants, are in areas of active uranium exploration and development. Prewitt was estimated to have 400 residents in 1977. Thoreau had 720 year-round inhabitants, and had an additional 1,500 residents during the term of BIA schools situated in the community (McKinley Area Council of Governments, 1977b).

A fourth community which has grown in recent years due to mine investment is the Village of Cuba in Sandoval County. However, the mineral resource which was developed at Cuba was copper, not coal or uranium. The 1971 opening of the Nacimiento Mine of Earth Resources Company stimulated the economy of the area significantly, and the population of the Village of Cuba increased by nearly 33 percent in the early 1970's (Ives and Eastman, 1975). Operations of the copper mine have been discontinued, and there is apparently little likelihood that they will be resumed soon (Earth Resources Company, 1977). However, even after the mine's closing, Cuba's growth has continued, due to the stimulus of minerals exploration in the region generally, and in the La Ventana and Star Lake coal fields in particular.

TABLE 2-5

NUMBER OF INHABITANTS OF  
MAJOR COMMUNITIES, ES REGION, 1950-1977

Community	1950 <sup>a</sup>	Percent of County Total	1960 <sup>a</sup>	Percent of County Total	1970 <sup>a</sup>	Percent of County Total	1977 <sup>b,c,d</sup>	Percent of County Total
	Number of Inhabi- tants		Number of Inhabi- tants		Number of Inhabi- tants		Number of Inhabi- tants	
MCKINLEY COUNTY								
Crownpoint (U)	n.a.	--	n.a.	--	n.a.	--	3,500	6.0
Gallup (C)	9,133	33.3	14,089	37.9	14,596	33.8	18,400	31.7
Prewitt (U)	n.a.	--	n.a.	--	n.a.	--	400	0.7
Thoreau (U)	n.a.	--	n.a.	--	n.a.	--	720	1.2
Zuni Pueblo (U)	2,563	9.3	3,585	9.6	3,958	9.2	4,200	7.2
SANDOVAL COUNTY								
Cuba (V)	n.a.	--	n.a.	--	415	2.4	550	2.3
SAN JUAN COUNTY								
Aztec (C)	885	4.8	4,137	7.8	3,354	6.4	4,650	6.8
Bloomfield (V)	n.a.	--	1,292	2.4	1,574	3.0	2,200	3.2
Farmington (C)	3,657	20.0	23,786	44.6	21,979	41.9	29,750	43.3
Shiprock (U)	n.a.	--	n.a.	--	n.a.	--	5,500	8.0
VALENCIA COUNTY								
Grants (C)	2,251	10.0	10,274	26.3	8,768	21.6	9,900	19.8
Milan (V)	n.a.	--	2,658	6.8	2,185	5.4	3,000	6.0

Notes: n.a., not available; in most years, data are not available until after incorporation.  
 (U), unincorporated  
 (C), incorporated as city  
 (V), incorporated as village

Sources: <sup>a</sup> U. S. Department of Commerce, Bureau of the Census, Census of Population: 1950-1970, Number of Inhabitants, New Mexico, 1952, 1962, 1973.  
<sup>b</sup> Harbridge House, Inc., estimates on the basis of New Mexico Employment Security Commission, New Mexico Annual Planning Report, Fiscal Year 1979, 1978, except for Crownpoint, Prewitt and Thoreau (c) and Shiprock (d), as noted.  
<sup>c</sup> McKinley Area Council of Governments, Overall Economic Development Program, 1977.  
<sup>d</sup> William F. Turney and Associates, U.S. Bureau of Reclamation-Navajo Tribal Utility Authority Water Study, 1976.



The ES Region is usually characterized as being inhabited by three cultures: Anglo, Hispano and Indian. While this generalization ignores the numerous distinctions which exist between members of these groups, especially between the eight Indian tribes, it does help to make evident the traditional balance which has existed in northwestern New Mexico between peoples of these three backgrounds. As shown in Table 2-6, inhabitants of the five-county area are relatively equally divided between persons whose primary language is English, those who principally speak Spanish, and those who utilize one of various Indian languages. The criterion of language is one of the most strict in defining cultural groups; there are many persons of Hispanic descent, for example, for whom English is now their native tongue. The figures given in Table 2-6 would be even closer if such persons were counted with the Spanish speakers.

Table 2-6 indicates the differing proportions of each county's population represented by the three groups according to the returns of the 1970 Census. The only county in which Anglos constituted a majority of the inhabitants is San Juan; Hispanos dominated Rio Arriba County; and Indians, chiefly the Navajo, made up 62.8 percent of the population of McKinley County. Sandoval County was similar to the regional pattern; although the western portions of the county which lie within the 75-mile highway driving distance defined earlier, comprise a largely Hispanic ranching community dating from the nineteenth century (U.S. Department of Agriculture, Soil Conservation Service, 1937). It is significant that the largest Anglo populations are located in the two counties, San Juan and Valencia, which have experienced the most minerals development and the greatest immigration from other regions.

The correlation between the number of Anglo residents and the history of development and migration is suggested by Table 2-7. San Juan County, in particular, is characterized by a relatively large number of persons born in another state. The two counties which have experienced the least minerals development, Rio Arriba and Sandoval, have around 80 percent native-born populations. Most of these long-time residents are Hispanos or Indians. Whereas Anglo populations increase with migration, the numbers of Hispanos and Indians grow through natural increase. Birth rates are higher and families larger. Among the Navajo, births exceed 36 per thousand of population, compared to a 1976 national average of 14.7. The rate is among the highest in the world (Turney & Associates, 1976). As a result, the median age among the Navajo is between 16 and 18 (Boyle, 1973; New Mexico Advisory Committee, 1976). Dependency ratios (see discussion of economic characteristics below) and household sizes (see description of housing units) are also high.

#### ECONOMIC CHARACTERISTICS

In 1977, an estimated 69,506 persons were employed full-time at locations in the five-county area, an increase of 14.1 percent over employment a year earlier (New Mexico Employment Security Commission, 1977c). The

TABLE 2-6

PERCENTAGES OF TOTAL NUMBER OF INHABITANTS BY PRIMARY LANGUAGE SPOKEN,  
FIVE-COUNTY AREA, 1970

<u>County</u>	<u>Speaking English</u>	<u>Speaking Spanish</u>	<u>Speaking an Indian Language</u>	<u>Other</u>	<u>Total</u>
McKinley	26.0	10.4	62.8	0.8	100.0
Rio Arriba	13.4	70.8	15.5	0.3	100.0
Sandoval	23.1	34.1	41.0	0.8	100.0
San Juan	56.1	6.9	36.1	0.9	100.0
Valencia	42.6	41.8	14.6	1.0	100.0
Five Counties	36.5	27.3	35.3	0.9	100.0

Source: U.S. Department of Commerce, Bureau of the Census, Census of Population: 1970, Characteristics of the Population: New Mexico, 1973.

TABLE 2-7

PERCENTAGES OF TOTAL NUMBER OF INHABITANTS BY PLACE OF BIRTH,  
FIVE-COUNTY AREA, 1970

<u>County</u>	<u>Born in New Mexico</u>	<u>Born in Other State</u>	<u>Foreign Born</u>	<u>Not Reported</u>	<u>Total</u>
McKinley	71.6	23.1	0.4	4.9	100.0
Rio Arriba	81.9	10.1	0.8	7.2	100.0
Sandoval	77.9	17.5	0.5	4.1	100.0
San Juan	53.2	41.0	0.5	5.3	100.0
Valencia	69.7	26.3	0.5	3.5	100.0
Five Counties	67.8	26.7	0.5	5.0	100.0

Source: U.S. Department of Commerce, Bureau of the Census, Census of Population: 1970, Characteristics of the Population: New Mexico, 1973.

four economic sectors which supplied the most jobs to residents of northwestern New Mexico were government and public education, wholesale and retail trade, mining and commercial and professional services, in that order. Reported employment for these and four other sectors are shown, by county, in Table 2-8. Gross personal income from all sectors was estimated to exceed \$589 million in 1975, the most recent year for which data are available (U.S. Department of Commerce, Bureau of Economic Analysis, 1977c). The greatest contributions to reported income were made by government and public education, mining, wholesale and retail trade, and transportation-communications-utilities. Gross personal income by sector is outlined for each county in Table 2-9.

The single most important sector in the economy of northwestern New Mexico is government, which accounts for approximately 21.2 percent of all jobs and 24.3 percent of all income. The importance of the government sector is due to the regional role of federal agencies, especially the Bureau of Indian Affairs (BIA), Forest Service and Indian Health Service (IHS), as well as specific installations like the Fort Wingate Military Depot in McKinley County. In some communities, federal payrolls are especially significant, such as Gallup, where one in every ten workers was employed by the BIA or the IHS in 1977 (McKinley Area Council of Governments, 1977b). In addition, state, county, municipal, and tribal governments contribute to the employment and income reported for the government sector.

Wholesale and retail trade has traditionally been a key component of the regional economy, and so has the provision of commercial and professional services. Farmington and Gallup grew as "border towns" selling Indians goods and services, including alcohol and entertainment, not available on the reservations. They retain that function. Prices in both "border towns" still average 10 percent less than those in trading posts or elsewhere on the Reservations (Federal Trade Commission, 1973). One study concluded that, notwithstanding the cost of gasoline and the addition of sales taxes on items, Indian buyers save money on purchases of food with up to a round-trip of 240 miles to Farmington or Gallup. Furthermore, the selection of goods is usually better at stores in the "border towns" (Kelley, 1977).

The growth of tourism has added to the regional importance of the trade and the services sectors. The rising incomes of many Americans and the increased mobility afforded by the private automobile permit millions of persons to enjoy what was once the luxury of long distance travel. In 1977, the four national monuments in northwestern New Mexico registered in excess of 410,000 visitors (U.S. Department of the Interior, National Park Service, 1977). The Acoma and Zuni Pueblos and the Navajo Indian Reservation are also major attractions, as are the desert scenery and dry climate of northwestern New Mexico generally. Tourist-related businesses in the region are numerous, including the manufacture and sale of "Indian" jewelry, which provides as many as 500 workers with seasonal employment (McKinley Area Council of Governments, 1977b).

TABLE 2-8  
NUMBER OF WORKERS EMPLOYED, FIVE-COUNTY AREA, 1977

Sector <sup>a</sup>	McKinley County		Rio Arriba County		Sandoval County		San Juan County		Valencia County		Five Counties	
	No. of Workers	% of County Total	No. of Workers	% of County Total	No. of Workers	% of County Total	No. of Workers	% of County Total	No. of Workers	% of County Total	No. of Workers	% of County Total
Agriculture <sup>b</sup>	156	8	390	6.3	827	16.3	569	2.1	817	7.1	2,767	4.0
Mining	4,407	22.9	42	.7	42	.8	2,557	9.3	2,377	20.7	9,425	13.6
Metals	4,199	21.8	1	.0	0	0	0	0	2,284	19.9	6,484	9.3
Petroleum	40	.2	41	.7	21	.4	1,920	7.0	83	.7	2,105	3.0
Construction	647	3.4	193	3.1	422	8.3	4,704	17.2	640	5.6	6,606	9.5
Manufacturing	1,155	6.0	420	6.7	1,022	20.1	1,114	4.1	274	2.4	3,985	5.7
Transportation, Communications, and Utilities	1,015	5.3	231	3.7	153	3.0	2,821	10.3	957	7.5	5,077	7.3
Trade	3,750	19.5	1,064	16.5	391	7.7	5,270	19.2	2,283	19.9	12,758	18.4
Finance, Insurance, and Real Estate	337	1.8	207	3.3	249	4.9	713	2.6	428	3.7	1,934	2.8
Services and Miscellaneous	3,242	16.8	1,331	21.2	872	17.2	5,553	20.2	1,190	10.4	12,188	17.5
Government	4,527	23.5	2,400	38.1	1,104	21.7	4,110	15.0	2,625	22.7	14,766	21.2
TOTAL	19,236	100.0	6,286	100.0	5,082	100.0	27,411	100.0	11,491	100.0	69,506	100.0

Notes: D, disclosure regulations restrict release of data.

Sources: <sup>a</sup> Hartsbridge House, Inc., estimates on the basis of New Mexico Employment Security Commission, "Table B-Labor Information Series, Non-Agricultural Wage and Salary Employment, 1st Quarter, 1977", 1978.

<sup>b</sup> Unpublished material, from New Mexico Employment Security Commission, 1978.

TABLE 2-9  
VALUE OF TOTAL PERSONAL INCOME, FIVE-COUNTY AREA, 1975 (in thousands of 1975 dollars)

Sector	McKinley County		Rio Arriba County		Sandoval County		San Juan County		Valencia County		Five Counties	
	Income	Percent	Income	Percent	Income	Percent	Income	Percent	Income	Percent	Income	Percent
Agriculture	13,076	7.7	2,545	5.1	1,435	4.5	35,410	15.8	12,322	14.0	64,788	11.5
Mining	31,538	18.6	6,316	12.6	2,046	8.9	34,094	15.2	12,978	14.8	87,772	15.6
Metals	10,507	6.1	2,414	5.7	4,732	13.3	37,738	16.8	6,894	7.8	95,204	16.8
Petroleum	0	0	1,599	3.2	3,245	10.2	40,428	18.0	0	0	47,258	8.5
Construction	13,297	7.8	11,969	24.1	5,167	16.2	20,217	9.0	3,677	4.2	54,382	9.7
Manufacturing	50,164	29.6	20,267	40.8	9,472	29.8	38,273	17.0	18,896	21.4	137,072	24.3
Transportation, Communications, and Utilities	0	0	0	0	0	0	0	0	0	0	0	0
Trade	0	0	0	0	0	0	0	0	0	0	0	0
Finance, Insurance, and Real Estate	0	0	0	0	0	0	0	0	0	0	0	0
Services	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	\$159,451	100.0	\$49,701	100.0	\$31,833	100.0	\$224,626	100.0	\$88,137	100.0	\$553,748	100.0

Notes: D, information withheld due to disclosure regulations.

Sources: Information as supplied by U.S. Department of Commerce, Bureau of Economic Analysis, August, 1977.

Mining has become the largest so-called "basic" sector in the economy of northwestern New Mexico. The mining sector exports most of its product in response to external market demand and obtains income from sales outside the ES Region. Mining therefore is commonly labeled, together with agriculture and manufacturing, as an "export" or "basic" sector which enriches the area and enables its residents to purchase desired programs, goods and services in "secondary" sectors like trade and services (Isserman, 1977). In 1977, minerals extraction provided jobs for 13.6 percent of all those employed in northwestern New Mexico, and 16.8 percent of the region's gross personal income. These totals represented increases of more than 1,300 percent since 1950. Rapid growth of the mining sector is responsible for a large percentage of total economic development. A modern industrial economy built on minerals resources is rapidly replacing the pastoral agrarian economy which characterized the region until after World War II.

Much of the growth of the transportation, communication, and utilities sector, for example, has stemmed from mining activity. Utilities are a particularly important feature of the economy of San Juan County, where the Four Corners and San Juan Power Plants utilize large quantities of coal to generate electricity for transmission and sale to users in Arizona, California, and Texas, as well as New Mexico. The manufacturing sector likewise draws on the region's minerals resource base. Natural gas and petroleum refineries outside Farmington and Gallup process much of the production of oil and gas wells in the San Juan Basin. In a few communities dependency on the mining sector is extreme. A recent count suggested that approximately half of the employed work force of Grants and Milan was occupied directly in minerals extraction (New Mexico Energy Resources Board, 1977).

Despite the rapid development of a regional economy with a minerals resource base and a focus on cities like Farmington and Gallup, many residents of northwestern New Mexico continue to live within a different economic order. Among the rural, largely Indian population, an agrarian autarky persists. While these inhabitants of the ES Region have acquired some modern accoutrements -- pickup trucks and radios, for example -- they are employed chiefly in subsistence ranching and traditional handicrafts, such as have been practiced in the region for two centuries or more. Except when these residents occasionally journey to one or another of the cities, they take their trade to local trading posts, where traders continue in a century-old role as merchants, financiers and brokers (Federal Trade Commission, 1973). In rural and reservation areas, the trader represents the link between the traditional and modern economies.

The unemployment rate among the Navajo of the Eastern Navajo Agency was officially reported to be approximately 40 percent in 1977 (Bureau of Indian Affairs, 1976a). Surveys of Navajo households in the area unofficially showed joblessness to reach as high as 56 percent among male heads of household, and higher among young men and women (Wistisen, et al., 1975). These Navajo are often unable or unwilling to find

TABLE 2-10

UNEMPLOYMENT RATES, FIVE-COUNTY AREA, 1977

<u>County</u>	<u>All Workers</u> <sup>b</sup>	<u>Hispanic Workers</u> <sup>c</sup>	<u>Indian Workers</u> <sup>c</sup>
McKinley	6.7	5.6	10.5
Rio Arriba	20.0	27.0	33.1
Sandoval <sup>a</sup>	8.1	9.6	12.1
San Juan	7.5	10.5	14.7
Valencia	7.5	12.4	18.7
Five Counties	12.7	11.0	13.5

Note: <sup>a</sup>Data is reported for Albuquerque Standard Metropolitan Statistical Area which comprises Bernalillo and Sandoval Counties.

Sources: <sup>b</sup>New Mexico Employment Security Commission, Affirmative Action Information, 1977, 1978.

<sup>c</sup>Harbridge House, Inc., 1978 estimates on the basis of formulae used by New Mexico Employment Security Commission for determinations of Affirmative Action Information Figures; formulae utilize 1970 census data to obtain minority employment ratios.

TABLE 2-11

PER CAPITA INCOMES, FIVE-COUNTY AREA, 1970-1977

<u>County</u>	<u>Per Capita Income, 1970</u> <sup>a,b</sup>	<u>Per Capita Income, 1977</u> <sup>c</sup>	<u>Annual Percent Change, 1970-1977</u>
McKinley	\$ 2,369	\$ 4,362	9.1
Rio Arriba	2,172	3,743	8.1
Sandoval	1,570	3,481	12.0
San Juan	2,549	5,180	10.7
Valencia	2,027	4,620	12.5
Five Counties	2,238	4,494	10.5

Sources: <sup>a</sup>University of New Mexico, Bureau of Business and Economic Research, New Mexico Statistical Abstract, 1975; except for Sandoval County for which data was obtained from b.

<sup>b</sup>Middle Rio Grande Council of Governments, Factual Digest of Bernalillo, Sandoval, Torrance, and Valencia Counties, 1974.

<sup>c</sup>Harbridge House, Inc., estimates on the basis of U.S. Department of Commerce, Bureau of Economic Analysis, unpublished computer printouts, 1977, utilizing consumer price index to arrive at 1977 figure from 1970-1975 data.



employment in urban centers, or live in locations which are isolated from the few cities. Consequently, they attempt to obtain a livelihood in traditional ways such as livestock husbandry (Nagel, 1974). Even those persons who are reported to hold jobs often remain employed only for short periods or have part-time positions. They seek principally to supplement traditional sources of income. Such job-holding is characteristic of Indians of most tribes, and of Hispanics of the historically Hispanic portions of Rio Arriba and Sandoval Counties (Wistisen, et al., 1975; Gray and English, 1976).

Throughout northwestern New Mexico, new industry has tended to locate in proximity to the region's urban communities. Mines represent exceptions, but most of these have been located within commuting distance of cities and have been characterized by largely Anglo workforces. Only those facilities situated on Indian lands have afforded non-Anglo residents of the ES Region much new employment. Efforts to create employment in rural and reservation areas have met with minimal success. Mining plans have frequently proven controversial, as with the several proposals for the Burnham area and the Dalton Pass area of the Navajo Indian Reservation. Operations once begun have often proven failures, as with the Earth Resources Company mine outside Cuba and the Fairchild Camera and Instrument Corporation plant near Shiprock.

In large part, the search for jobs by Hispanos and Indians of northwestern New Mexico has led them away from rural areas to cities in the region or beyond, like Albuquerque and Denver. This movement of rural Hispanic and Indian populations into urban areas is significant, inasmuch as it brings both into economic competition with the largely Anglo populations of the cities. Social and cultural effects of this competition are described in the section describing social and cultural characteristics, below. The economic effects are evident in the preponderance of Hispanos and Indians in low-wage positions, and in unemployment rates for both groups which are at least two percentage points higher than for Anglos, although lower than in rural areas (New Mexico Employment Security Commission, 1975). The unemployment rates which characterize the five-county area are shown in Table 2-10.

The 1970 Census indicated the existence of wide disparities in the percentages of the Anglo, Hispanic, and Indian populations with incomes which are less than the federally defined minimum. Whereas 26.9 percent of all families in the five-county area were reported to be living with incomes less than the poverty level, 31.2 percent of Spanish-surnamed families were living below the poverty level, and among some Indians tribes as many as 65 percent of all families were so reported (Bureau of the Census, 1973; Navajo Nation, 1974). Of reported median incomes, Hispanic workers had 92.6 percent of the average in the five county area while Indians had as little as 37.7 percent of the average median income in San Juan County, and 48.8 percent in McKinley County (Bureau of the Census, 1973; Wistisen, et al., 1975).

TABLE 2-12

CONDITIONS OF COMPONENTS OF COMMUNITY INFRASTRUCTURE,  
ES REGION, AS PERCEIVED BY RESIDENTS, 1977

Components of Community Infrastructure Per- ceived to Be Deficient	Percent of Respondents to Question <sup>a</sup>			
	All	Anglo	Hispanic	Indian
Transportation Networks	15.9	27.6	9.1	0.0
Housing Stock	12.7	24.1	9.1	4.2
Educational Systems	4.8	6.9	9.1	0.0
Law Enforcement	11.1	6.9	9.1	8.3
Water Supplies	12.7	10.3	0.0	20.8
Other Public Utilities	12.7	17.2	0.0	0.0

Note: <sup>a</sup> 64 of 110 key informants responded to questions regarding effects of recent development in the ES Region--29 Anglo, 11 Hispanic, 24 Indian.

Source: Harbridge House, Inc., Northwestern New Mexico Key Informants Survey, 1978.

As Table 2-11 shows, per capita incomes in northwestern New Mexico have been rising by as much as 12.5 percent a year. Although no estimates are made generally for ethnic groups in the ES Region, surveys still suggest that Hispano and Indian populations lag behind Anglos in incomes, by as much as 85 percent (Bureau of Economic Analysis, 1977; Wistisen, et al., 1975). These figures take on greater significance when they are translated into dollars. It is estimated that the average inhabitant of San Juan County had in excess of \$3,500 more a year to spend than did a Navajo resident living in the Burnham area of the Navajo Indian Reservation.

As shown below, employment and income are not the only areas in which Indians fare less well than the general population. Components of community infrastructure -- highways, housing, schools, etc. -- are usually most developed in the region's cities, where they meet the demands of a largely Anglo population. Rural and reservation communities generally suffer from a lack of the same facilities and services.



## COMMUNITY INFRASTRUCTURE

As communities in the ES Region have grown in size, public and private utilities and services have expanded to meet increased demand. However, large investments in new facilities and programs have generally been inadequate to accommodate growth. Deterioration of existing roads and other structures has resulted from overuse, while the quality of services afforded residents has been diminished by lack of trained personnel. Interviews with 132 key informants in the ES Region during the summer of 1977 indicated that inhabitants of northwestern New Mexico are troubled by traffic congestion, shortages of housing, overcrowding of schools, overloading of water and sanitary systems, increasing crime and disorder, and related problems. One of every three persons contacted mentioned one or more instances of deterioration in utilities and services (Harbridge House, 1977). Their responses are summarized in Table 2-12. As may be seen in the table, Anglos perceive the greatest adverse effects of recent growth on community infrastructure, which reflects their predominance in the urban areas which bear the brunt of immigration.

The subsections below describe components of community infrastructure in the ES Region. Objective indicators of local conditions are presented, and compared to residents' perceptions obtained in interviews with key informants.

### Governmental Authorities

Seven levels of government operate in the ES Region. The jurisdictions of federal, state, regional, county, municipal, special district and tribal agencies often overlap. In urban areas the number of governments is usually larger than in rural areas, due to greater needs for public services. However, the checkerboard pattern of land ownership in northwestern New Mexico results in a confusion of jurisdictions even in less populous portions of the region. The federal government is important in this respect due to its large land-holdings, managed by the Bureau of Land Management (BLM), Forest Service and other agencies. The State of New Mexico similarly has title to vast acreages, while the various tribes possess allotments outside their reservations, the most extensive of these being the lands of the Navajo existing within the Eastern Navajo Agency of the BIA.

Responsibilities for the maintenance of facilities and the provision of services fall mostly to counties, municipalities, special districts and tribes. Transportation networks are an exception: federal and state agencies regulate or maintain most aspects of transport in the region. Housing is primarily a concern of counties (and of regional councils of governments); on reservations, housing projects are undertaken by tribes and/or the BIA. Public schools are operated by special districts; Indian

TABLE 2-13

GOVERNMENTAL REVENUES AND EXPENDITURES, ES REGION, 1977

<u>Government</u>	<u>Budgeted Revenues</u>	<u>Budgeted Expenditures</u>	<u>Budgeted Balance</u>	<u>Surplus(or Deficit) as % of Revenues</u>
State of New Mexico <sup>c</sup>	\$667,299,000	\$611,214,000	\$56,085,000	8.4
McKinley County <sup>d</sup>	1,922,829	1,905,586	17,243	0.9
Rio Arriba County	1,892,392	2,063,555	(171,163)	(9.0)
Sandoval County	1,333,808	1,666,867	(333,059)	(25.0)
San Juan County	4,667,355	5,096,305	(428,950)	(9.2)
Valencia County	2,660,846	2,565,043	95,803	3.6
City of Aztec <sup>d</sup>	1,485,649	1,674,910	(189,261)	(12.7)
Village of Bloomfield	2,632,198 <sup>a</sup>	720,221	1,911,977	72.6
Village of Cuba	976,633 <sup>a</sup>	273,453	703,180	72.0
City of Farmington	19,715,336	21,287,083	(1,571,747)	(8.0)
City of Gallup	11,123,900	12,229,086	(1,105,186)	(9.9)
City of Grants	3,628,512	3,572,227	56,285	1.6
Village of Milan	634,325	667,791	(33,466)	(5.3)
Aztec Public School District	3,564,852	3,878,603	(313,751)	(8.8)
Bloomfield Municipal School District	4,661,074	5,661,979	(1,000,905)	(21.5)
Central Consolidated School District	9,602,501	15,054,627	(5,452,126)	(56.8)
Cuba Independent School District	2,023,814	2,076,170	(52,356)	(2.6)
Farmington Public School District	10,772,264	13,001,575	(2,229,311)	(20.7)
Gallup-McKinley School District	22,258,458	26,013,182	(3,754,724)	(16.9)
Grants Public School District	8,373,014	9,217,819	(844,805)	(10.1)
Jemez Mountain School District	1,488,455	1,608,312	(119,857)	(8.1)
All local governments	\$115,418,215	\$130,234,394	\$(14,816,179)	(12.8)

Note: <sup>a</sup>extraordinary source of revenues budgeted.

<sup>b</sup>deficits indicated by parantheses.

Source: <sup>c</sup>New Mexico Department of Finance and Administration, New Mexico State Budget, 1977-1978, 1977.

<sup>d</sup>New Mexico Department of Finance and Administration, Local Government Division, County Governments and Municipal Governments, 1977.

<sup>e</sup>New Mexico Department of Finance and Administration, Public School Finance Division, Statistics: Public School Finance, 1977.

children may also attend the schools of the BIA, and there are a few private and religious institutions independent of all governments. Responsibility for health care is shared in similar fashion; counties and municipalities maintain public facilities, the IHS operates others, and there are some private and religious institutions. Police and fire protection, as well as sanitary systems are generally provided by counties, tribes, or municipalities.

In some areas, facilities and services are operated by joint arrangements. Grants and Milan, for example, share a library, an airport, recreational facilities, a jail, and a sewer system. Relative costs and rate schedules are negotiated. On the Navajo Indian Reservation, the tribe enters into many projects with the support of the BIA; most aspects of community infrastructure involve both tribal agencies and federal authorities.

The rising demand for services by the increasing population of the ES Region has led to greater government spending. In fiscal 1977, local government budgets were up by 51.1 percent over the year earlier, and were projected to exceed revenues by 12.8 percent, or \$14.8 million, as shown in Table 2-13. Deficits existed in three of five counties, four of seven municipalities, and all school districts (New Mexico Department of Finance and Administration, 1977d). In contrast, the State of New Mexico had a budgetary surplus of \$56.1 million, or 8.5 percent of revenues. The pressure of continued growth in the ES Region is forcing public authorities to borrow up to their debt limits and to appeal to the State for assistance. By law, a portion of severance tax receipts should be returned to localities in the vicinity of developed mines. However, severance taxes accrue after mine operations have begun -- and after migration induced by the economic opportunity represented by the mine has occurred. Therefore, in the short-term, local governments in northwestern New Mexico appear to lack sufficient source of guaranteed funding for expansion of services.

#### Transportation Networks

The primary mode of transportation in the ES Region is the private automobile. There are few alternate means of transport. Exceptions are the three largest cities -- Farmington, Gallup and Grants -- which possess limited air, rail, bus and truck service. Other than chartered buses or trucks, small towns and rural areas lack public transportation. Inhabitants rely on cars and pick up trucks, which utilize numerous unimproved roads and dirt tracks as well as paved highways maintained by state, county, municipal, and tribal agencies. The principal problems of transportation in northwestern New Mexico are therefore related to automobile and truck traffic. Highways carry loads beyond design capacities, and deterioration of roadbeds, surfaces, shoulders and associated structures is widespread.

FIGURE 2-3

RAIL, AIR, AND BUS SERVICE, ES REGION, 1977

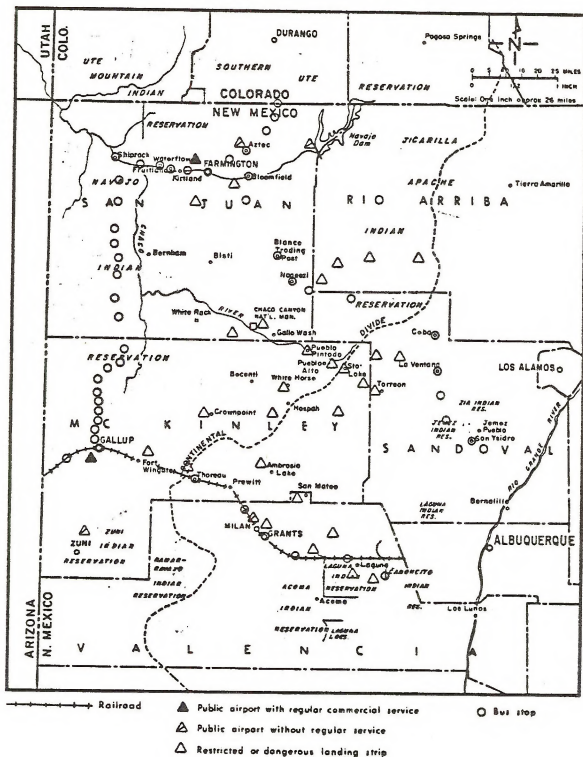
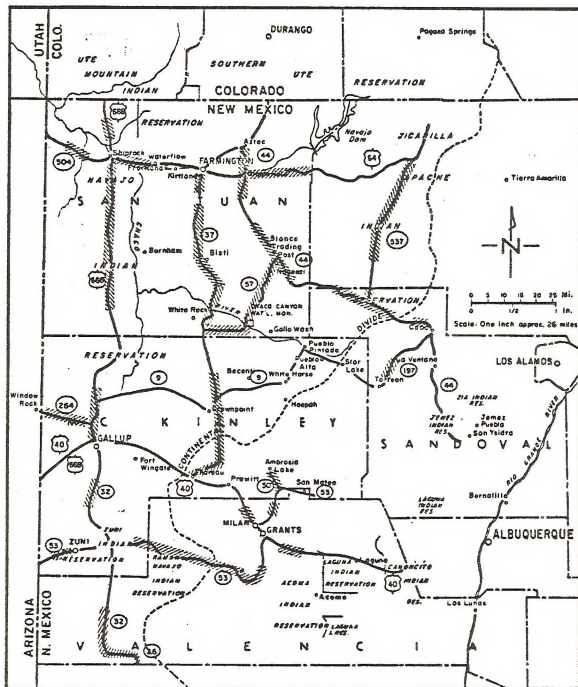


Figure 2-3 indicates the extent to which the ES Region is served by air and rail lines. Farmington and Gallup are linked with ten cities in four states by a total of 48 regularly scheduled, direct commercial flights (Ruben H. Donnelley Corp., 1978). Chartered and private aircraft also operate from the Farmington and Gallup airports, as they do from two airfields near Grants. Light planes and helicopters utilize 29 landing strips located elsewhere in the ES Region on an irregular basis. The more important of these facilities are adjacent to growing communities like Aztec and Crownpoint, or mining districts like Ambrosia Lake and San Mateo. They average as many as 100 operations a week, due to use by government agencies and mineral exploration companies (New Mexico Aviation Board, 1978).

Rail service in northwestern New Mexico is typical of most western states. All of San Juan County and the western portions of Rio Arriba and Sandoval Counties are without any rail connections. Twenty to 25 trucking firms provide short-distance freight-hauling in these areas, as well as McKinley and Valencia Counties, which are crossed by a rail line (New Mexico Energy Resources Board, 1977). The Santa Fe Railroad line between Albuquerque and Flagstaff runs through both these counties, with short spur lines at Fort Wingate, Guam and the McKinley Mine in McKinley County, and Pagate in Valencia County. Passenger rail service is offered by the National Passenger Rail Corporation (Amtrak); freight shipments are handled by offices of the Santa Fe Railroad at Gallup and Grants (National Passenger Rail Corp., 1978; New Mexico Energy Resources Board, 1977).

As shown in Figure 2-3, buses maintain intercity service along major highways in the ES Region. These routes connect all the principal communities with the exception of Crownpoint (Continental Trailways, 1978; Greyhound Corporation, 1978). However, rural areas away from Interstate Highway 40, U.S. Highways 550 and 666, and New Mexico Highway 44 are not served by intercity or local bus lines. The territory of the Eastern Navajo Agency is essentially without bus service, although on occasion mining companies charter vehicles to carry workers to and from isolated operations. Urban areas also lack local public transit, with the exception of Gallup, where a "Business Urban System" (BUS) links the city's environs with the central business district. In the place of other forms of public transit, an estimated 30-35 taxicabs operate in the ES Region, but all are centered in the principal communities (New Mexico Department of Motor Vehicles, 1976).

Given the distances which separate cities and the low population densities of northwestern New Mexico, the development of air, rail, and bus lines has been limited. Therefore, cars and trucks are the means of most travel, and the maintenance and improvement of the roads which these vehicles use is the focus of the transportation plans of local and regional governments. With the increasing population of the ES Region, levels of traffic on major highways have also been rising. Average daily



~~////////~~ Deficient segments



TABLE 2-14

## HIGHWAY USE AND CONDITIONS, ES REGION, 1977

Highway	Segment	Miles	Surface	Width (in feet)	Design Speed (in miles per hour)	ADT <sup>a</sup> (in thousand cars per day)	Condition Rating	Comment on Flow or Condition
Interstate 40/ US 66	Bernalillo-Valencia County Line to Grants	41.4	bituminous	40	70	9-10	A-B	4.1 miles of deteriorated surface
	Grants to Thoreau	24.8	concrete/ bituminous	40	70	8-9	A	
	Thoreau to Gallup	27.3	concrete/ bituminous	40	70	8-10	A	
	Gallup to Arizona- New Mexico State Line	25.7	concrete	40	70	7-8	A	
US 64	Dulce to Rio Arriba- San Juan County Line	48.5	bituminous	22-26	40-60	0-1	B	2.3 miles judged to be unsafe; with 9.7 miles of deteriorated surface
	Rio Arriba-San Juan County Line to Bloomfield	22.4	bituminous	22-24	50-60	0-3	B	19.7 miles judged to be unsafe
	Bloomfield to Farmington	12.2	bituminous	36	70	6-8	B	no structural deficiency identified; heavy traffic flow diminishes operating conditions
US 550	Colorado-New Mexico State Line to Farmington	23.2	bituminous	36	60	2-8	C	no structural deficiency identified; heavy traffic flow diminishes operating conditions
	Farmington to Shiprock	34.0	bituminous	28-44	60-70	6-7	D	4.7 miles judged unsafe; with traffic flow exceeding capacity and foundation deteriorated
	Shiprock to Naachitti	48.8	bituminous	20-28	60	2-4	D	1.4 miles judged unsafe; with deteriorated surface
US 666	Colorado-New Mexico State Line to Shiprock	17.7	bituminous	20-50	60	1-2	B	42.8 miles judged unsafe, with traffic flow exceeding capacity; foundation deteriorated
	Shiprock to Naachitti	48.8	bituminous	20-28	60	2-4	D	5.5 miles judged unsafe; 12.1 miles of surface deteriorated, 3.6 miles of foundation deteriorated
	Naachitti to Gallup	40.9	bituminous	32-40	60-70	2-9	B-D	13.0 miles judged unsafe, with 9.6 miles of deteriorated foundation
NM 32	Gallup to McKinley- Valencia County Line	41.5	bituminous	22-44	60	1-3	B	22.3 miles judged unsafe, with 27.4 miles of deteriorated surface
	McKinley-Valencia County Line to Valencia- Catron County Line	41.4	bituminous/ gravel	20-28	60	0-1	B-C	
NM 44	San Ysidro to Cuba	39.4	bituminous	36	60	1-3	B	no structural deficiency identified; heavy traffic flow diminishes operating conditions
	Cuba to Rio Arriba- San Juan County Line	44.7	bituminous	22-40	60	1-3	B-C	1.8 miles judged unsafe, with 30.6 miles of deteriorated surface

TABLE 2-14

## HIGHWAY USE AND CONDITIONS, ES REGION, 1977 (continued)

Highway	Segment	Miles	Surface	Width (in feet)	Design Speed (in miles per hour)	ADT <sup>a</sup> (in thousand cars per day)	Condition Rating	Comment on Flow or Condition
NM 44	Rio Arriba-San Juan County Line to Bloomfield	43.7	bituminous	22-36	60	2-4	C	27.4 miles judged unsafe; with 17.7 miles of deteriorated surface
	Bloomfield to Aztec	9.0	bituminous	24	60	2-3	C	6.4 miles judged unsafe; with deteriorated surface
NM 53	San Mateo to Granta	20.3	bituminous	22-50	60	2-3	C	2.3 miles judged unsafe; heavy traffic flow diminishes operating conditions
	Granta to El Morro	40.2	bituminous	20-44	50-60	0-1	B	29.3 miles judged unsafe, due to design
	El Morro to Arizona- New Mexico State Line	44.9	bituminous	20-30	60	1-4	B-C	8.5 miles judged unsafe, with heavy traffic flow exceeding capacity
NM 57	Blanco Trading Post to White Rock	39.7	dirt/gravel	20	40	0-1	D	route unimproved; poorly marked, impossible in wet weather
	White Rock to Crownpoint	27.0	dirt/gravel/ bituminous	24	40	0-1	B-D	20.3 miles unimproved, poorly marked, impossible in wet weather; of remainder 2.8 miles unsafe, with 3.9 miles of deteriorated surface
	Crownpoint to Thoreau	21.2	bituminous	24	60	1-3	B	16.9 miles of deteriorated surface
NM 96	Coyote to Cuba	33.5	bituminous	24-30	50	0-1	B	26.5 miles judged unsafe, with 21.4 miles of deteriorated surface
NM 112	Regina to Llaves	10.4	gravel	20	35	0-1	B	10.4 miles judged unsafe, with deteriorated surface
NM 197/ Navajo 9	Cuba to Torreon	25.6	bituminous	22-28	60	0-1	B	9.8 miles judged unsafe due to design
	Torreon to Crownpoint	60.0	bituminous	25	60	0-1	A	
	Crownpoint to Twin Lakes	43.0	bituminous	25	60	0-1	A	
NM 264	Ganero to Arizona- New Mexico State Line	15.9	bituminous	30	60	4-5	C	9.0 miles judged unsafe, with heavy traffic flow exceeding capacity
NM 371	Farmington to White Rock	57.9	dirt/gravel/ bituminous	30	40-50	0-3	B-D	41.5 miles unimproved, poorly marked, impossible in wet weather; of remainder 5.0 miles judged unsafe, due to design
TOTAL	All Segments	1026.2	all surfaces	20-50	35-70	0-10	A-D	250.9 miles judged unsafe, with deficient segments on every major highway

Notes: <sup>a</sup>ADT -- average daily traffic.

<sup>b</sup>Condition Rating is based on Adjusted Rating of New Mexico Highway Department, with A=75-100, B=50-74, C=25-49, and D=0-24; with A indicating best conditions, D worst, according to terms of New Mexico Highway Department, Rating for Highway Improvement Procedures Manual, 1973.

Sources: New Mexico Highway Department, Rating for Highway Improvements, 1976, 1977, except for Navajo routes, for which data was obtained from U.S. Department of the Interior, Bureau of Indian Affairs, Navajo Area Office.



vehicle miles of travel in McKinley, Rio Arriba, Sandoval, San Juan, and Valencia Counties rose by more than 80 percent between 1966 and 1977, and automobile registrations nearly doubled (New Mexico Department of Motor Vehicles, 1966-1977). In the decade after 1966, there were 1.1 additional motor vehicles registered for each additional inhabitant.

Serious accidents have become more common as road surfaces and structures have deteriorated from heavy use (New Mexico State Police, 1972-1976). Driving times have increased, while operating speeds have been reduced (New Mexico Highway Department, 1977a). Figure 2-4 identifies the major highways of the region. Shaded portions were reported to be deteriorated or unsafe in 1977; criteria were those of the New Mexico Highway Department. Table 2-14 characterizes present operating conditions, including comments by responsible agencies on specific highway deficiencies along major routes. As the table indicates, 24.4 percent of the regional road network is judged unsafe at current levels of use; one-third of all highway miles are deficient by current design and maintenance standards. A total of 250.9 miles is considered to be below safety standards, including portions of U.S. 550 between Farmington and Shiprock, U.S. 666 between Shiprock and Gallup, and N.M. 44 between Cuba and Aztec. Residents' perceptions of increased levels of traffic and decreased travel times are thus supported by objective indicators of the conditions of major highways.

While major highways in the ES Region are -- with the exceptions noted in Table 2-14 -- improved and maintained by the State of New Mexico and by the Bureau of Indian Affairs, access and feeder routes outside large communities are unimproved and not maintained. Roads in the territory of the Eastern Navajo Agency, with the exception of New Mexico Highways 54 and 197 and Navajo Route 9, are generally deficient. In rural areas of McKinley, Sandoval, and San Juan Counties, few highways are paved. Roads leaving Navajo Route 9 frequently become unmarked dirt tracks, impassible in wet weather. One such road in the vicinity of Pueblo Pintado and Star Lake is the dirt track paralleling the Texas - New Mexico Pipeline Company Pipeline. Minerals exploration in the area has resulted in increased road use despite its poor condition. For the desert area east and northeast of Chaco Canyon National Monument, the track is a primary means of access, although it is unpaved, difficult to locate, and, with precipitation, hazardous to travel.

#### Housing Units

The principal housing type in northwestern New Mexico is the detached, owner-occupied, single family home. Half of all dwelling units in the ES Region are of this type. Rented homes, apartments and other multiple family units represent an estimated 30 percent of the housing stock. Mobile homes, which until recently accounted for only a small fraction of all housing, now account for 20 percent of available housing units.

TABLE 2-15

HOUSING UNITS, FIVE-COUNTY AREA, 1970

County	Conventional Single-Family Homes		Multiple-Family Units		Mobile Homes		Total Units	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
McKinley	8,302	79.0	1,428	13.6	776	7.4	10,506	100.0
Rio Arriba	6,501	88.1	330	4.5	550	7.4	7,381	100.0
Sandoval	4,205	91.4	158	3.4	239	5.2	4,602	100.0
San Juan	11,513	78.1	1,636	11.1	1,597	10.8	14,746	100.0
Valencia	9,341	82.2	634	5.6	1,388	12.2	11,363	100.0
Five Counties	39,862	82.0	4,186	8.6	4,550	9.4	48,598	100.0

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Housing, General Characteristics - New Mexico, 1972.

TABLE 2-16

HOUSING CONDITIONS, FIVE COUNTY AREA, 1970

County	Units With More Than One Person Per Room		Units Without Any Plumbing		Substandard Units <sup>a</sup>		Total Units	
	Person	Per Room	Units	Without Plumbing	Substandard Units <sup>a</sup>	Without Plumbing	Total Units	
McKinley	4,027	38.3	3,830	36.5	2,698	25.7	10,506	100.0
Rio Arriba	1,873	25.4	2,798	37.9	950	12.9	7,381	100.0
Sandoval	1,468	31.9	1,535	33.4	946	20.6	4,602	100.0
San Juan	3,582	24.3	2,753	18.7	1,707	11.6	14,746	100.0
Valencia	2,616	23.0	2,039	17.9	966	8.5	11,363	100.0
Five Counties	13,566	27.9	12,955	26.7	7,267	15.0	48,598	100.0

Note: <sup>a</sup>Substandard units are defined as units with more than one person per room and without any plumbing.

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Housing, General Characteristics - New Mexico, 1972.

Table 2-15 gives the number of units by housing type for the five county area reported in the 1970 Census. Eighty-two percent of all units in northwestern New Mexico were conventional single family homes at the last Census. Table 2-16 indicates the degree to which the Census showed that housing was overcrowded or otherwise deficient. In 1970, approximately five percent of all dwelling units in northwestern New Mexico was substandard; in McKinley County, substandard housing was 25.7 percent of the total stock. Recent studies show that the percentage of substandard housing has not significantly declined in recent years and in some areas has increased (McKinley Area Council of Governments, 1976; Middle Rio Grande Council of Governments, 1976c).

Marked disparities exist between the quality of housing occupied by Anglo residents of urban areas and Indian inhabitants of rural areas. The percentage of urban housing which was reported to be overcrowded ranged from 10.4 percent in Farmington to 20.8 percent in Grants (Bureau of the Census, 1973). By contrast, a majority of residences on the Navajo Indian Reservation and in the territory of the Eastern Navajo Agency had two or more persons per room, twice the national standard for overcrowding. A recent survey suggested that 47 percent of Navajo homes lacked electricity, 75 percent did not have bathroom facilities, and 74 percent were without indoor plumbing (Wistisen, et al., 1975). These figures indicate continued use by Indians of traditional dwellings. In Navajo camps scattered throughout the ES Region, 11 percent of all dwellings are traditional adobe, log or stone hogans, while an additional 60 percent are frame homes of a transitional style of construction (Wistisen, et al., 1975). As a result of programs by the Bureau of Indian Affairs and the Navajo Tribe, rectangular frame or concrete-block houses of modern construction are beginning to replace older structures.

With continued population growth, a pressing need for more and better housing exists in the ES Region. New home construction has not kept pace with recent population increases, and a lack of housing is extreme in communities like Gallup. As a result, substandard or overcrowded living conditions among lower income families have persisted except in a few localities targeted by federal or tribal programs.

The slow rate of new home construction is the outcome of several factors. Land for subdivision and development is scarce in communities like Crownpoint and Farmington, which are both surrounded by public lands. This scarcity makes what little property which is available to builders relatively expensive. Consequently conventional single family homes built on this expensive land are often designed for upper income buyers. Building costs are also high because of distances from Albuquerque, which is the state's distribution center for construction materials and the home base of most building contractors (Middle Rio Grande Council of Governments, 1976c). All of these costs add to the purchase price of a

TABLE 2-17

PUBLIC EDUCATIONAL SYSTEMS PERSONNEL AND FACILITIES, WITH MEASURES OF ADEQUACY, ES REGION, 1977

<u>School District</u>	<u>1977<sup>b,e</sup> ADM</u>	<u>Size of<sup>c,e</sup> Teaching Staff</u>	<u>Training and<sup>d,e</sup> Experience Index</u>	<u>Pupil<sup>e</sup> Teacher Ratio</u>	<u>Size of<sup>f</sup> Support Staff</u>	<u>Pupil<sup>f</sup> Support Staff Ratio</u>
MCKINLEY COUNTY						
Gallup-McKinley School District	12,229	600.8	.957	20.4	100.6	121.6
RIO ARriba COUNTY						
Jemez Mountain School District	536	32.5	.950	16.7	4.0	134.0
SANDOVAL COUNTY						
Cuba Independent School District	960	52.0	.988	20.5	13.3	738.5
SAN JUAN COUNTY						
Aztec Public School District	2,151	97.5	1.022	20.9	16.0	134.0
Bloomfield Municipal School District	2,448	113.0	1.030	21.6	17.6	139.1
Central Consolidated School District	5,185	232.0	.992	23.5	40.7	127.4
Farmington Public School District	7,184	325.5	1.043	22.4	53.6	134.0
VALENCIA COUNTY						
Grants Public School District	5,746	256.8	.950	22.0	47.0	122.3
ES REGION	36,439	1,710.0	.986	21.3	292.8	124.5
Accepted Standard <sup>a</sup>	--	--	1.042	21.0	--	44.5

Notes: <sup>a</sup> averages for State of New Mexico in 1977 as reported by New Mexico Department of Finance and Administration, Public School Finance Division.

<sup>b</sup> ADM is average daily membership for September, 1977, to January, 1978, period (average attendance).

<sup>c</sup> part-time personnel averaged in to total figure.

<sup>d</sup> index reflects years of education and experience as calculated by New Mexico Department of Finance and Administration, Public School Finance Division.

Sources: <sup>e</sup> New Mexico Department of Finance and Administration, Public School Finance Division, Statistics-Public School Finance, 1977 and as provided separately, 1978.

<sup>f</sup> New Mexico Department of Education, Annual Statistical Report, 1977.

new home. The average purchase of a new home in Gallup during 1977 required an estimated \$6,000 more than the purchase of a comparable home in Albuquerque (McKinley Area Council of Governments, 1977b). In Grants, the cost differential was reported to be \$10,000 in 1976 (New Mexico State Planning Office, 1976).

Another factor limiting the availability of housing is the lack of sufficient capital for the financing of both builders and buyers. Twenty financial institutions operated in the ES Region in 1977, including six credit unions. Relative to the total population, the size of their combined assets and outstanding loans was small. In New Mexico as a whole, banks, savings and loan associations, and credit unions loaned \$1.00 per inhabitant; in the ES Region the rate of lending was \$0.30 per resident. The disparity reflects a wide difference in the relative size of assets: \$4.44 per inhabitant of the state, but \$1.89 per resident in the ES Region (New Mexico Department of Banking, 1977). The lack of capital is aggravated by special circumstances in some areas. In Grants and Milan there are no saving and loan associations: such institutions customarily are large lenders to homebuilders and home buyers. In Gallup, conservative banking practices restrict lending. Loans represent less than 53 percent of the assets of local financial institutions, ten percent less than the state average New Mexico Department of Banking, 1977).

The limited supply of conventional single family detached houses has resulted in the growing sales of mobile homes. The attractiveness of mobile homes also lies in their relatively low cost. For lower income residents or newly-arrived inhabitants with limited credit references, the choice in most communities often appears to be between buying a mobile home or not buying a home at all. As a result, the number of mobile homes has been growing rapidly. In 1976, there were 1,542 mobile homes in McKinley County, an increase of 98.7 percent over 1970 (McKinley Area Council of Governments, 1977b). Similar trends have been reported elsewhere: in Sandoval County, 1,281 mobile homes in 1976 represented a 527.9 percent increase since 1970. Likewise, in Valencia County, a reported 3,040 mobile homes were occupied in 1976, a gain in six years of 161.2 percent (Middle Rio Grande Council of Governments, 1976c). Some recent studies suggest that mobile homes represented as much as 80 percent of all new homes sales in 1977 (New Mexico State Planning Office, 1976).

#### Educational Systems

The chief agents of primary and secondary school education in the ES Region are eight public school districts whose attendance in the first half of the 1977-1978 school year averaged 36,439 students. These school systems are in turn associated with local branches of the University of



New Mexico or New Mexico State University which constitute the principal source of higher education. The BIA operates day and boarding schools located throughout the region for Indian, usually Navajo, pupils; in 1977-1978, these schools had combined enrollments of nearly 7,000 students. Twenty-one private and parochial schools provided education to an additional 4,500 students, many of whom were Indians attending mission schools near the Navajo Indian Reservation (New Mexico Department of Finance and Administration, 1978; Bureau of Indian Affairs, 1978).

Public school districts in the ES Region have been confronted with rapidly increasing enrollments since 1970. Immigration of new families with school-age children has been one reason for the increases. A second has been the movement of Indian children into the public schools. Traditionally, the responsibility for Indian education has rested with the BIA. Recently, however, enrollments at BIA schools have been dropping, while those at nearby public institutions have grown (U.S. Department of the Interior, Bureau of Reclamation, 1976b). Districts in San Juan County have been most affected. The Central Consolidated School District, which has responsibility for the Navajo Indian Reservation and adjacent areas, recorded increases in enrollments of more than 35 percent between 1970 and 1977.

All public school districts have had difficulties accommodating growth, as key informants suggested in Table 2-12. Table 2-13 showed that every district had a budget deficit in 1977-1978. Deficits reflect needs for new capital spending, personnel hiring, and program development. In 1977, every district except Cuba and Jemez Mountain reported that enrollments were exceeding design capacity in one or more schools. The Gallup-McKinley School District was overcrowded to the point that 28.7 percent of all classrooms in use were temporary facilities. Table 2-17 indicates another problem facing school districts, that of obtaining sufficient numbers of qualified teaching personnel. Pupil-teacher ratios exceed the accepted standard and state average in the Bloomfield, Central Consolidated, Farmington, and Grants systems in 1977. In all but the Farmington Public School District, teachers' qualifications fell beneath the New Mexico average in the state index of training and experience (New Mexico Department of Finance and Administration, 1977c).

The four public institutions of higher education located in northwestern New Mexico all were established in the 1960's or 1970's. They have also been experiencing the problems of rapid growth. The Gallup branch of the University of New Mexico which was established in 1968 had more than 900 students and 40 faculty members in 1977. The San Juan and Grants divisions of New Mexico State University had a total of 1,325 students and 95 faculty members in the same year, while the branch of the Navajo Community College at Shiprock was estimated to have an enrollment of 300 and a faculty of 23. All four institutions had programs leading to Associate in Arts degrees, with further education possible through the parent university or college.

## Health Care Services

Public health care systems in the ES Region consist of programs of the Indian Health Service (IHS), which are designed for the Indian population, and of programs of county health agencies and nonprofit hospital corporations, which serve the remainder of the region's inhabitants. Table 2-18 details health care personnel and facilities, by agency, for each county. As the table suggests, McKinley County is the medical center of northwestern New Mexico, with three hospitals in Gallup, including the large Gallup Indian Medical Center. The facility at Gallup is the IHS hospital of reference for much of the Four Corners area and possesses many sophisticated medical technologies. Non-Indians do not possess a comparable resource, and local hospitals usually refer patients to hospitals in Albuquerque or Denver.

Most parts of the ES Region have a serious shortage of medical personnel and health care facilities, as suggested by Table 2-19. The ratios of residents per doctor, residents per registered nurse, and residents per dentist are above accepted standards in every county; only McKinley County has an adequate supply of licensed practicing nurses and hospital beds. The personnel and facilities which are available are usually located in urban areas; rural communities are poorly served, despite the scattering of outpatient clinics shown in Table 2-18. The deficiencies in health care systems are especially severe in Rio Arriba County, which was designated as a critical medical shortage/dental shortage area by the Secretary of Health, Education, and Welfare in January, 1977. By the same standards of having more than 4,000 residents to each physician, and more than 5,000 residents to each dentist, Sandoval County was labeled a critical medical shortage area, and Sandoval and Valencia Counties were named as critical dental shortage areas. However, Western portions of these counties, those in the ES Region, had relatively more doctors and dentists than eastern areas. (U.S. Department of Health, Education, and Welfare, 1978).

Health care among Indians in northwestern New Mexico is characterized by unique features. Traditional healing practices continue to be used, along with modern medical procedures. In particular, the Navajo, although often belonging to a Christian denomination, frequently retain a belief in the native religion. The medicine man or listening woman therefore continues in his or her longtime role in dealing with sickness and healing. While Indians resort to "Anglo medicine" for specific cures of bodily ailments, they also participate in ceremonies, or "sings," to restore the harmony of man and nature, which the sickness signifies has been broken. Modern medical procedures are perceived to treat the symptoms of illness, and traditional healing practices to treat the roots of sicknesses (U.S. Department of Health, Education and Welfare, Indian Health Service, 1976).

TABLE 2-18

PUBLIC HEALTH CARE SYSTEMS PERSONNEL AND FACILITIES, ES REGION, 1977

Health Care Agency	Facilities	Average <sup>c</sup>			Out-Patient Facilities <sup>b,d</sup>	
		Accreditation <sup>a,c</sup>	No. of <sup>c</sup> Personnel	No. of <sup>c</sup> Hospital Beds		Hospital Bed Occupancy
MCKINLEY COUNTY						
Indian Health Service	Crownpoint Indian Hospital	B	107	56	41.1	No permanent field stations; periodic clinics at 7 locations
	Gallup Indian Medical Center	A,B	415	181	76.8	Field stations at Pinedale, Tohatchi and Wingate
	Zuni Indian Hospital	B	101	45	30.8	none
McKinley General Hospital <sup>d</sup>	---	B	105	60	62.2	none
Presbyterian Health Services <sup>d</sup>	Ojo Encino Clinic	C	6	none	---	Field station of Cuba Clinic
Rehoboth Christian Hospital	---	A,B	85	41	61.0	none
RIO ARRIBA COUNTY						
Centro Campesino de Salud <sup>e</sup>	Coyote Clinic	none	3	none	---	Field station of Espanola Clinic
SANDOVAL COUNTY						
Presbyterian Medical Service <sup>f</sup>	Cuba Clinic	C	10	10	n.a.	Satellite stations at Counselors, Nageezi, Ojo Encino and Torreon
SAN JUAN COUNTY						
Brethren in Christ <sup>d</sup>	Navajo Health Care Center	C	5	none	---	none
Indian Health Service	Shiprock Indian Hospital	A,B	127	69	66.2	Satellite stations at Sanostee and Toadlena
Presbyterian Medical Service <sup>d</sup>	Nageezi Clinic	C	5	none	---	none
San Juan Regional Medical Center	San Juan Hospital	A,B	260	118	61.0	none
Seventh Day Adventists <sup>d</sup>	Lavida Mission Clinic	C	2	none	---	none
VALENCIA COUNTY						
Cibola General Hospital	---	A	64	43	44.2	none

Notes: <sup>a</sup> the code regarding accreditation is: A-accredited by the Joint Commission of the American Hospital Association; B-member of American Hospital Association, not accredited; and C-clinic, not accredited.

<sup>b</sup> only facilities open daily shown.

Sources: <sup>c</sup> American Hospital Association, Guide to the Health Care Industry, 1977, except for clinics for which see d, e and f.

<sup>d</sup> Indian Health Service, Profiles: Service Units, 1976, as updated by information supplied by IHS.

<sup>e</sup> information supplied by Centro Campesino de Salud.

<sup>f</sup> New Mexico Energy Resources Board, Managing the Energy Boom in Northwestern New Mexico, 1977.



Alcoholism among Indians represents a problem which neither traditional nor modern techniques have been able to eliminate. In border towns and on reservations, alcoholism represents the foremost health care challenge. Although the extent of the disease is widely recognized, there is dispute over its sources (Levy and Kunitz, 1974). To date, programs to deal with alcoholism have been insufficient in size or scope, although alcohol-treatment facilities do exist in most parts of the ES Region. Similarly, the numerous mental health programs undertaken by federal, state, and local authorities have been inadequate, require coordination to increase effectiveness and expansion to meet demand (McKinley Area Council of Governments, 1977b). To the extent that both alcoholism and mental disorders in the population result from broader social and cultural problems, they represent health care needs which can only be met through large-scale efforts.

#### Public Safety and Police Protection

The number of crimes reported in the ES Region has recently been rising. In the Governor's Council of Criminal Justice 1977 Comprehensive Plan, San Juan and Valencia Counties were designated Class II High Crime Areas. These two counties, as shown in Table 2-20, have the highest per capita crime rates in northwestern New Mexico. However, the 1971-1976 increases in the number of crimes reported were greater in McKinley, Rio Arriba and Sandoval Counties than in San Juan, and local officials suggest that actual, rather than reported, crime rates may be nearly equal because many crimes against Hispanos and Indians in rural areas go uncounted. In McKinley County, for example, an estimated 50 to 75 percent of crimes committed outside Gallup are estimated to be not reported (McKinley County Sheriff's Department, 1977).

Although crime rates in the ES Region are below the national average, reported criminal activity is concentrated in a few areas, notably the border towns, such as Farmington and Gallup. Violations of the law are often linked to consumption of alcohol by Indians. One study of offenses in Farmington indicated that Indians accounted for 69 percent of the city's drunken driving arrests and 89 percent of arrests for disorderly conduct (Battelle Columbus Laboratories, 1974). The particular kinds of crime reported in border towns are reflected in the list of the ES Region's principal law enforcement problems -- drunken driving, speeding and disorderly conduct (New Mexico Energy Resources Board, 1977). Recently, local police departments have received special financing and undertaken specific programs to curb these types of criminal activity. However, significant reduction in the number of alcohol-related crimes depends upon the implementation of broader programs, as discussed in relation to health care.

In the number of residents per officer, local police departments meet national standards, with the exception of rural areas of Rio Arriba, Sandoval, and Valencia Counties. Table 2-20 suggests the adequacy of

TABLE 2-19

HEALTH CARE SYSTEMS, MEASURES OF ADEQUACY, ES REGION, 1977

<u>Area</u>	<u>Population</u>	<u>Physicians</u>		<u>Registered Nurses</u>		<u>Licensed Nurses</u>		<u>Dentists</u>		<u>Hospital Beds</u>	
		<u>Number</u>	<u>Residents</u> <u>per</u>	<u>Number</u>	<u>Residents</u> <u>per</u>	<u>Number</u>	<u>Residents</u> <u>per</u>	<u>Number</u>	<u>Residents</u> <u>per</u>	<u>Number</u>	<u>Residents</u> <u>per</u>
McKinley County <sup>c</sup>	58,000	63	921	100	580	77	753	14	4,143	383	151
Rio Arriba County-Coyote <sup>d</sup> and Jicarilla CCD's	4,650	0	--	1	4,650	0	--	0	--	0	--
Sandoval County-Cuba CCD <sup>c</sup>	3,600	4	900	4	900	4	900	1	3,600	10	360
San Juan County <sup>c</sup>	68,700	58	1,184	36	1,908	50	1,374	23	2,987	187	367
Valencia County-Pence Lake, <sup>c</sup> Grants and Laguna CCD's	27,400	7	3,914	4	6,850	4	6,850	3	9,133	43	637
ES Region	162,350	132	1,230	145	1,120	135	1,203	41	3,960	623	261
Accepted Standard	--	--	620 <sup>a</sup>	--	260 <sup>a</sup>	--	870 <sup>a</sup>	--	1,725 <sup>a</sup>	--	250 <sup>b</sup>

Notes: <sup>a</sup>as given by the American Medical Association, 1977.

<sup>b</sup>as proposed by U.S. Department of Health, Education, and Welfare, September, 1977.

Sources: <sup>c</sup>New Mexico Energy Resources Board, Managing the Boom in Northwestern New Mexico, 1977.

<sup>d</sup>information supplied by Centro Campesino de Salud of Espanola, 1978.

police protection in the ES Region. However, the vast land area, rugged terrain and dispersed populations of northwestern New Mexico present special problems for law enforcement agencies. In the territory of the Eastern Navajo Agency, the checkerboard pattern of land ownership further complicates police protection. State, county and tribal jurisdictions overlap and a confusion of responsibilities is the occasional result.

#### Fire Control

Fire control agencies existing in the ES Region are generally limited to urban areas. Rural areas possess little or no fire protection, other than from agencies like the BLM and the Forest Service in relation to public lands. Table 2-21 indicates that where fire departments do exist, they exceed accepted standards in number of personnel. Equipment and facilities are also reported to be adequate. However, outside incorporated communities and the few unincorporated localities with fire stations (Crownpoint, Shiprock, Thoreau), fire protection is usually poor. San Juan County, where six rural fire districts have been organized, is an exception. As might be expected, the greatest number of full-time, professional firemen, and of sophisticated, recent equipment is located in the three largest cities -- Farmington, Gallup and Grants.

These cities' fire departments extend their services to adjacent rural areas on an "as needed" basis. Federal agencies responsible for public lands in the ES Region also join in fire-fighting when it threatens broad areas; the checkerboard pattern of land ownership in much of the ES Region makes specific distinction of responsibilities nearly impossible. The BLM has fire stations at Cuba and Farmington; the Forest Service has three stations located near Fort Wingate, El Morro and Grants. Under exceptional circumstances, the Boise, Idaho, Interagency Fire Control Center can mobilize additional manpower and equipment.

#### Water Supply Systems and Wastewater Treatment

Water supply systems and wastewater treatment in northwestern New Mexico are features of urban areas. Few rural communities in the ES Region possess either. For example, western Rio Arriba County, having no incorporated community inside the ES Region, has no such systems. Water supply and wastewater treatment require advanced technologies in what is essentially a desert environment. Surface water is scarce and only seasonally available, even along streams like the Las Animas and San Juan Rivers and the Rio Puerco. Groundwater formations often possess a large quantity of minerals and salts and withdrawals must be processed. In areas which are presently served by water supply systems, supplies are usually sufficient to satisfy present consumption; most facilities for

TABLE 2-20

## PUBLIC SAFETY AND POLICE PROTECTION, WITH MEASURES OF ADEQUACY, ES REGION, 1977

Area	Population	1976 <sup>a,e</sup> Reported Crimes per Thousand	1971-1976 <sup>c</sup> Percent Increase in Crimes	Incorporated Communities <sup>f</sup>		Unincorporated Areas <sup>d,f</sup>	
				No. of Officers	Residents per Officer	No. of Officers	Residents per Officer
McKinley County	58,000	35.5	15.9	44	418	125	317
Rio Arriba County - Coyote and Jicarilla CCD's	4,650	41.8	20.8	--	--	2.5	1,786
Sandoval County- Cuba CCD	3,600	24.3	12.9	4	138	3	1,016
San Juan County	68,700	46.4	11.2	77.5	472	69	465
Valencia County- Fence Lake, Grants & Laguna CCD's	27,400	46.8	18.6	31	416	10	1,460
ES Region	162,350	41.9	15.3	156.5	437	209.5	385
Accepted Standard <sup>a,b</sup>	--	52.8	8.4	--	500	--	500

Notes: <sup>a</sup> Crime rate standard is national average, percent increase in crimes is state average.

<sup>b</sup> Residents per officer ratios as recommended by the Federal Bureau of Investigation.

<sup>c</sup> Crime rates and percent increase in crimes reported on a county-wide base.

<sup>d</sup> Officers in unincorporated areas include state, county and tribal policemen; ratios count only populations in unincorporated areas.

Sources: <sup>e</sup> New Mexico Governor's Council on Criminal Justice Planning, Comprehensive Plan, 1977.

<sup>f</sup> Information provided by departments, consistent with New Mexico Energy Resources Board, Managing the Energy Boom in Northwestern New Mexico, 1977.

TABLE 2-21

## FIRE PROTECTION, WITH MEASURES OF ADEQUACY, ES REGION, 1977

Area	Population	Incorporated Communities <sup>a,c</sup>			Unincorporated Areas <sup>a,c</sup>		
		No. of Fire Stations	Professional/ Volunteer Firemen	Residents per Fireman	No. of Fire Stations	Professional/ Volunteer Firemen	Residents per Fireman
McKinley County	58,000	2	23/15	484	5	25/50	520
Rio Arriba County- Coyote and Jicarilla CCD's	4,650	--	--	--	--	--	--
Sandoval County- Cuba CCD	3,600	1	1/40	88	(served by Cuba Fire Department)		
San Juan County	68,700	4	49/75	295	7	0/150	214
Valencia County- Fence Lake, Grants & Laguna CCD's	27,400	3	10/34	294	--	--	--
ES Region	162,350	10	83/164	289	11	25/200	400
Accepted Standard <sup>b</sup>	--	--	--	560	--	--	560

Notes: <sup>a</sup> Figures are estimates due to imprecise boundaries of fire control areas; a portion of the Gallup Fire Department has been allocated to unincorporated areas, for example.

<sup>b</sup> Residents per fireman ratios conform to average for small municipalities given by International City Management Association.

Sources: <sup>c</sup> Information provided by departments, consistent with New Mexico Energy Resources Board, Managing the Boom in Northwestern New Mexico, 1977.

wastewater treatment are likewise adequate. Exceptions include Aztec, Crownpoint and Bloomfield, where peak daily demand for water exceeds supply, and Aztec and Bloomfield where water treatments plants are operating at 100 and 175 percent of capacity, as shown in Table 2-22. Wastewater quality is reportedly deficient at two additional locations - Crownpoint and Cuba -- where design capacities for water treatment are not yet being exceeded but where effluents nonetheless violate state standards.

In the Navajo Indian Reservation, and in the territory of the Eastern Navajo Agency, most inhabitants must haul water from springs and wells. In other rural parts of the ES Region, residents depend on individual, privately-owned sources of water. Sewerage is usually delivered to septic tanks, if residences possess any plumbing at all.

### Solid Waste Disposal

Disposal of solid waste is not considered to be a serious problem in the ES Region. County dumps and sanitary landfills are located near urban communities as shown in Table 223. Most municipalities have collection services, either operated by local governments or under contract to a private company. Trash burning and indiscriminate dumping occur despite such services in urban communities; in rural areas, there are no alternatives. In the absence of county-wide solid waste disposal systems, both burning and dumping are the most convenient means of disposing of garbage and will continue.

### Electric and Natural Gas Utilities

The ES Region is well supplied with energy by the Colorado River Storage Project (CRSP) of the Bureau of Reclamation, by municipal, private, and cooperative power companies and by natural gas distributors. Electricity is delivered to the region from CRSP and from the Four Corners and San Juan Generating Stations near Farmington. Total electric consumption in 1977 was estimated at 868.3 million kilowatt hours (KWH), or 5,348 kwh per resident for all uses (McKinley Area Council of Governments, 1977b). Recent growth in demand for electricity has been rapid; the Continental Divide Electric Cooperative has reported annual increases in the number of electrical connections of approximately seven percent. Demand for natural gas has also been increasing, although at a lesser rate, due to rising prices which reflect the national gas shortage.

TABLE 2-22

WATER SUPPLY AND WASTEWATER TREATMENT, ES REGION, 1977

<u>Community Systems</u>	<u>Water Supply</u> <sup>b</sup>		<u>Wastewater Treatment</u> <sup>b</sup>		<u>Comment</u>
	<u>Capacity</u> (gallons/day)	<u>Consumption</u> (average gallons/day)	<u>Capacity</u> (gallons/day)	<u>Flow</u> (average gallons/day)	
MCKINLEY COUNTY					
Crowpoint	980,000	650,000	240,000	240,000	Effluents violate state standards. Expansion of both systems underway.
Gallup	5,000,000	3,500,000	2,500,000	1,600,000	Expansion of water supply being considered.
Thoreau	36,000	17,000	28,000	15,000	
Other public & private systems	900,000	300,000	---	--	
SANDOVAL COUNTY					
Cuba	310,000	80,000	120,000	70,000	Effluents violate state standards. Expansion of both systems underway.
SAN JUAN COUNTY					
Aztec	3,000,000	1,400,000	1,400,000	530,000	Expansion of sewer system underway.
Bloomfield	2,000,000	1,200,000	125,000	280,000	Effluents violate state standards.
Farmington <sup>a</sup>	24,000,000	8,500,000	10,000,000	3,000,000	Expansion of sewer system underway.
Other public & private systems	646,000	n.a.	---	--	
VALENCIA COUNTY					
Grants/Milan	6,200,000	3,500,000	2,000,000	1,480,000	Trunk line between communities overloaded; expansion underway.

Notes: <sup>a</sup>Farmington pipes water to adjacent unincorporated areas of Fruitland, Kirtland and Waterflow, and to Shiprock.

Sources: <sup>b</sup>Information as supplied by municipalities, consistent with New Mexico Energy Resources Board, Managing the Boom in Northwestern New Mexico, 1977.



## SOCIAL AND CULTURAL CHARACTERISTICS

The ES Region is inhabited by three cultures, composed of three racial or ethnic groups -- Anglos, Hispanos and Indians (Meinig, 1971). Indian tribes were early settlers of northwestern New Mexico: the Acoma, Jemez, Laguna, Zia, and Zuni Indians inhabiting pueblos in the east and south of the region since at least the fifteenth century, the Jicarilla Apache living in the western portions of Rio Arriba County where they were driven by the Comanches in the seventeenth century, the Utes occupying a reservation north of Farmington to which they were sent in the nineteenth century, and the Navajo residing throughout the five counties as they have for four centuries (Beck, 1962). The first Spanish explorers appeared in the sixteenth century, but colonists from the Rio Grande Valley followed only in the nineteenth century (Meinig, 1971). Anglo farmers settled the San Juan River area and the vicinity of Gallup after 1850.

For a century, these three cultural groups shared in a primarily agrarian life-style. Each maintained a large measure of independence of the other two, and separate languages, value systems, and religious traditions persisted. Recent minerals development in the ES Region, however, has resulted in the immigration of Anglos from outside northwestern New Mexico. At the same time, small-scale and subsistence ranching has become less economic, forcing rural residents of all backgrounds to migrate into urban areas to obtain work. These trends have brought the three cultures into greater contact and occasional conflict. The predominance of Anglos in the cities has intensified pressures on Hispanos and Indians to conform to the values and life-styles of an alien culture.

Relations between members of the three groups are often strained. Although Hispanic Americans are aware of, and indeed suffer from, discrimination, the major racial tensions in the ES Region appear to exist between Indians and Anglos. There are several reasons for conflicts in Anglo-Indian relationships. First, the economic and political interests of these two groups are often at variance, and Indians consider themselves to be at a comparative disadvantage. Second, Anglo residents include relative newcomers to the area who are unfamiliar with the region and its cultural history; the values, beliefs, and customs of the Indians seem alien and, at times, incomprehensible to immigrant Anglos (New Mexico Advisory Committee, 1975). Finally, Anglos often feel that Indians receive preferential treatment from the federal government in the form of public assistance, medical care, and other benefits, at the expense of non-Indian taxpayers.

Tensions between the two groups surface in border towns, where Anglos and Indians most frequently come into contact with each other. However, interviews with 110 residents of the ES Region suggested that border town elites and business people tend to express less hostility toward Indians

TABLE 2-23

SOLID WASTE DISPOSAL, ES REGION, 1977

<u>County/Communities</u>	<u>Personnel</u>	<u>Equipment</u>	<u>Condition of Equipment</u>	<u>Landfills</u>
<u>McKinley</u>				
Crownpoint	1	2 collectors 1 landfill	Adequate	1.5 acres, no lifespan estimate
Gallup	40	7 collectors 6 landfill	Adequate	57 acres, 10-year expected life
<u>Sandoval</u>				
Cuba	3	2 landfill	Adequate	3 acres, 10-year expected life
<u>San Juan</u>				
Aztec	4	2 collectors 1 landfill	Adequate	10 acres, 4-year expected life
Bloomfield	2.5	1 collector 1 landfill	Inadequate	10 acres, no lifespan estimate
Farmington	30	13 collectors 3 landfill	Adequate	20 acres, no lifespan estimate
<u>Valencia</u>				
Grants	7	4 collectors 2 landfill	Adequate	20 acres, 5-year expected life
Milan	5	2 collectors 1 landfill	Adequate	20 acres, no lifespan estimate

Source: Information as supplied by municipalities, consistent with New Mexico Energy Resources Board, Managing the Boom in Northwestern New Mexico, 1977.



than do other Anglos, due to an awareness of their dependence on Indian trade. One factor which serves to reinforce the negative attitude of Anglos toward Indians is the serious problem of alcohol abuse. Alcoholism, especially public drunkenness, was mentioned previously in the discussions of health care and police protection. It is particularly acute in border towns such as Gallup and Farmington, where Indians are the major offenders. Because liquor is prohibited on the Navajo Indian Reservation by the Tribal Council, Navajos go off the Reservation to buy and drink liquor. Anglos are thereby made extremely aware of the problem of Indian alcoholism, and area residents tend to perceive the Indians, in general, to be alcoholics. This perception has undoubtedly had a detrimental effect on relations between Anglos and Indians (Levy and Kunitz, 1974).

Race relations have occasionally deteriorated into violence. These incidents have convinced residents of the seriousness of the problem. Thirteen percent of the Anglos interviewed by Harbridge House in the summer of 1977 added at the close of the conversation that improving race relations ought to be the first priority of the community. Yet there is considerable disagreement over the basis of conflict and the means of reconciliation. The New Mexico Advisory Committee, in its report to the National Commission on Civil Rights, concluded that Indians suffer from injustice and maltreatment in almost every area of contact with Anglos -- justice, public and medical services, employment opportunities, and economic development (New Mexico Advisory Committee, 1975). However, Anglo residents often strongly dispute these findings, and the New Mexico Advisory Committee's report has been subject to heated criticism. Anglos perceive a "reverse bias" which operates in favor of Indians, at their expense.

The following analyses were developed from specially conducted interviews with 110 individuals living in McKinley, Sandoval, San Juan, and Valencia Counties. Of the total of 110 interviews conducted with key informants, 44 interviews were held with Anglos, 17 with persons of Hispanic background, and 49 with Indians. These persons were selected according to the methodology given in the Technical Appendix. Representation of each of the major sociocultural groups in the region and of important subgroups was insured.

#### Anglo Residents

Native Anglo residents of the ES Region have traditionally been occupied in ranching and farming in rural areas and in retail trade and services in the cities. Native Anglos are characterized by agrarian and small-town outlooks which emphasize independence, self-sufficiency and equality. Agriculture is considered to be the basic industry upon which all progress and prosperity is based. Rural life-styles are believed to

TABLE 2-24

## ATTITUDES TOWARD COMMUNITY, ES REGION, 1977

Value of Areas as Place to Live	All	Anglo	Hispano	Indian
Above average	66	25	8	33
Average	34	13	7	14
Below average	7	5	1	1
No response	3	1	1	1
<u>Feelings Toward Neighbors</u>				
Very positive	47	13	6	28
Positive	45	20	8	17
Neutral	12	7	2	3
Negative	3	3	0	0
Very negative	0	0	0	0
No response	3	1	1	1
<u>Assessment of Personal Influence</u>				
Very much	9	7	1	1
Some	43	19	8	16
A little	32	9	6	17
Very little	17	4	1	12
None	9	5	1	3
<u>Sense that Government Represents Interests</u>				
Always	5	5	0	0
Often	32	15	9	8
Sometimes	42	13	6	23
Rarely	26	7	2	17
Never	5	4	0	1

Note: Respondents totaled 110, with 44 Anglos, 17 Hispanos, 49 Indians.

Source: Harbridge House, Inc., interviews with Key Informants, 1977.

TABLE 2-25

## PERCEPTIONS OF QUALITY OF LIFE, ES REGION, 1977

Positive Aspects	All	Anglo	Hispano	Indian
The land	55	10	3	42
The people	62	15	5	42
The climate	16	13	3	0
Pace of life	10	5	4	1
Employment opportunities	10	2	4	3
Business opportunities	9	8	0	1
Schools	9	3	1	5
Recreational opportunities	9	7	2	0
Small-town atmosphere	6	4	2	0
Other	2	2	0	0
No response, nothing	9	3	3	3
<u>Negative Aspects</u>				
Isolation from major cities	12	8	2	2
Poor public services	7	5	2	0
Conservatism of long-time residents	7	7	0	0
Poor road conditions	6	4	2	0
Lack of concerted planning	5	5	0	0
Shortage of housing	4	4	0	0
Overcrowded schools	3	2	0	1
Crime	3	1	1	1
Prejudice and racial conflict	3	1	1	1
Climate	4	2	2	0
Development which is now occurring	4	1	0	3
Other	16	11	3	2
No response nothing	52	5	4	43

Note: Respondents totalled 110, with 44 Anglos, 17 Hispanos, 49 Indians.

Source: Harbridge House, Inc., interviews with Key Informants, 1977.

be natural and moral. Urban living, on the other hand, is felt to result in an emphasis upon leisure and materialism, rather than on hard work and asceticism (Vogt, 1955; Fleigel, 1976). Although few Anglos in northwestern New Mexico are still able to support themselves by ranching alone, many continue to hold onto their ranches while having jobs elsewhere. Anglo newcomers to the ES Region have less firmly established ties to the land and to agriculture. These individuals tend to have migrated to the area since 1950 in response to employment opportunities created by the growth in mining and related industries. They exhibit a variety of skills, both blue- and white-collar. In addition, teachers, doctors, business operators, and others not employed directly by the mining companies, have added to the population influx.

Several key values and beliefs are identified in responses from the 43 Anglos interviewed in the key informant survey. These values and attitudes appear characteristic of Anglo residents of the ES Region. Anglo respondents expressed generally positive feelings concerning their communities and the people living in them. Fifty-eight percent of the Anglo respondents rated their communities as above average, while only 11 percent gave them a below-average rating. When asked about their neighbors living in the area, 77 percent of the Anglo respondents expressed very positive feelings. Responses to questions are shown in Table 2-24 and Table 2-25. The interviews conducted with key informants did suggest that recent migration due to development of energy resources had introduced political and social strains into the Anglo community. Newcomers described long-time residents as too conservative (see responses noted above), while natives felt that new migrants were an unsettling influence on the community.

With such a large and diverse number of people migrating into the ES Region recently, it is difficult to ascribe any one set of cultural values and beliefs to Anglo newcomers. Generalization on the basis of occupation, however, suggests two major types of migrants. The first group of newcomers can be characterized as executives and skilled power plant workers. Professionals such as doctors and teachers are also included in this group. These people are considered by long-time residents to be more educated, liberal, and cosmopolitan than the native population. This perception was borne out by interviews with professional and executive newcomers. Coming primarily from large cities in the midwest or west coast, this group of newcomers tends to be more interested in social and environmental issues than are the long-time area residents. A primary concern noted by this group was the lack of action in preparing for energy developments in their communities. Like the lifelong residents, they value the beauty of the land and the friendliness of the people. However, in contrast to native residents, they felt that existing public facilities (particularly schools and roads) and services are currently inadequate.

The second type of newcomers to the area consists of semi- and unskilled laborers. Many are brought into the region to work on the construction of power plants and mines, and most usually leave when the construction

phase is completed. Others arrive to work in the mines, or having heard that there were jobs in the area, come in search of work. Unlike the professional/executive group, these new residents do not usually remain in the community for any length of time but, when a particular construction project is completed, move to another location where employment is available. Since this is, numerically, the larger group of newcomers and because some of them either prefer to live close to their work sites or cannot find conventional housing, many have settled in mobile-home parks at the outskirts of existing cities and villages. Therefore, these transient newcomers are highly visible and are those newcomers with whom long-time residents have had the most contact.

These transients are perceived to have little interest in community affairs and have had little close contact with native residents who often view them with alarm. Two respondents characterized these newcomers as "rough," more prone to violence than long-time residents. But the most frequent classification of them by other Anglo respondents was simply as "transient," without any ties to the community. Because of the nature of their jobs, they are single or have left their families behind. They lack the familial relationships which occupy much of the leisure time of older residents. Even those workers who have brought along their families live with the others in crowded housing or in closely packed mobile home parks. Few wish to spend all their non-working hours in such quarters. They seek entertainment, along with the single workers, in local bars and nightspots. These activities, while unremarkable in a more urban setting, seem "rough" to local residents, particularly since these activities are often associated with the consumption of alcohol.

Unfortunately there is little information on the religious beliefs of the area residents, native or immigrant. However, the population appears to have religious affiliations which are similar to those of the state as a whole. In general, the Anglos tend to belong to a variety of Protestant faiths -- predominantly Methodist, Baptist, Presbyterian and in San Juan County, Church of Jesus Christ of the Latter Day Saints (Mormon) (Bureau of Reclamation, 1976b). Religion is very important to older residents of the area. One evidence of this importance is the popularity of a local television station, the programming of which is exclusively devoted to religion.

#### Hispanic Residents

Most of the Spanish American or Hispanic residents of the ES Region are descended from the settlers of the Rio Grande Valley. Especially in Sandoval and Rio Arriba Counties they tend to live on, or near, the land of their fathers, and many continue in similar life-styles. Hispanic residents are often ranchers, farmers, or owners of small retail stores and live in small rural communities such as Coyote and Cuba.

Traditionally attached to their land, many Hispanos have been forced from rural areas to cities in search of work. Thus, Hispanos appear to be a people in transition from rural to urban life (Bureau of Reclamation 1977). Some localities like Cuba have become more populous as mineral resource developments have attracted workers into the area. This type of urbanization has led Hispanos to a growing awareness of, and participation in, Anglo society. With this increased participation has come a growing sense of discrimination. However, no apparent political or activist organization in the ES Region was mentioned as representing the interests of Hispanic Americans as a group. Consequently, Hispanic resentment is usually politically diffused.

Whether Hispanos live a traditional rural life or have moved to the larger cities in search of employment, they share certain values and beliefs which separate them from Anglo residents. Hispanic Americans have close family ties. Twenty-nine percent of the Hispanic respondents in Harbridge House interviews said that the best aspect of the area was the fact that their relatives lived close by. Hispanos share a common language which maintains their cultural cohesion and works against assimilation into the English-speaking society. Hispanos regard Spanish as one basis of their cultural heritage. The other is the Roman Catholic Church which is not only a religious organization but the social focus of Hispanic communities (Bureau of Reclamation, 1977). Since the majority of Anglos in the ES Region belong to various Protestant faiths, religious beliefs further distinguish the two groups.

On the basis of interviews conducted with 17 knowledgeable informants from this group, Hispanos appear to share several values with native Anglo residents. In key informant interviews, as shown in Table 2-24 and 2-25, Hispanic respondents felt that their communities were average or above average places to live. The presence of their families, the friendliness of their neighbors, and the relaxed lifestyle are the aspects of the region Hispanos like. On the other hand, physical isolation, poor public services, and poor transportation and communications were often mentioned as the least liked aspects of the area. A majority of Hispanic respondents believed that they had either very much or some influence over what happened in their areas, and that local governments represented their interest always or often.

#### Indian Residents

Indians living in the ES Region are not a homogeneous group. Those who live in urban communities on reservations, such as Shiprock or in Farmington, Gallup or other off-reservation towns, are far more acculturated to Anglo society than those who reside in rural reservation areas. In general, individual Indians can be placed on a cultural continuum ranging from very traditional to largely acculturated (Bureau of Reclamation, 1976). Those on the traditional side of the continuum



speak little or no English, often live in hogans or pueblos, pursue an agricultural way of life and maintain the values and beliefs of their ancestors. Acculturated Indians tend to retain many traditional beliefs of their tribes, but their life-style differs little from that of their Anglo and Hispanic neighbors.

Although the degree to which individual Indians pursue a traditional way of life may vary, all share certain values and beliefs which differ from those of non-Indians. Above all, they share an ethnic identity and an awareness of a common heritage which serves to foster a high degree of group awareness. The Indian belief system, for example, is based upon the idea of harmony between man and nature. While Anglos tend to believe that they can manipulate their natural environment, Indians view nature as more powerful than man. Therefore, the key to survival is to accept and live with nature rather than to change or control it (Witherspoon, 1974). The Anglo conception of individual wealth in the sense of monetary accumulation is often not valued; too much wealth may be viewed with suspicion. Each Indian has responsibilities to his family and clan relatives which work against capital accumulation (Bureau of Indian Affairs, 1976a).

Indian cultures are currently in stages of transformation. Traditional values of cooperation are in conflict with Anglo values of competition and older conceptions of nature conflict with newer ideas of technology. Medicine Men, for example, while important in rituals, are ignored when Navajo go to clinics or hospitals for health care. Differences among individual tribal members in terms of attitudes and life-styles are becoming more evident and have led to conflicts within tribes.

Like the Anglo and Hispanic respondents to key informant interviews, the 49 Indians contacted expressed a love of the region. In fact, the Indians appeared to be even more strongly attached to their communities. As shown in Table 2-24, 67 percent rated the area as an above average place to live and 93 percent said that they felt positive or very positive toward the people living with them. Far fewer of the Indian respondents than was true for the other two ethnic groups indicated that they had actually been personally affected by the developments that had been occurring in the area in recent years. Fifty-one percent answered no to this question. Only 29 out of the 49 had even heard of the developments elsewhere. Apparently the geographic isolation of many of the rural Indians has helped shield them from some of the impacts that are being experienced by urban Anglo and Hispanic residents of the ES Region.

In their responses to questions concerning the extent of their social and political influence and the degree to which local and tribal governments represent them, Indians revealed a sense of powerlessness and alienation which is striking in contrast to responses from Anglos and Hispanos. Only 35 percent of Indians interviewed felt that they had very much or some influence, compared to 58 percent of Anglos and 53 percent of the Hispanos. The groups which feel least represented by state, county, local, and tribal governments are clearly Indian.

## FUTURE ENVIRONMENT WITHOUT THE PROPOSED ACTIONS

Projections of the social and economic development of the five-county area and the ES Region have been developed from recent trends. Patterns of growth have been described previously; the Technical Appendix outlines the assumptions and methodologies with which forecasts were constructed. Essentially, it has been assumed that no fundamental shifts in growth rates or sectoral relationships will occur. New investment in mines and related facilities will continue on state, Indian, and private land and on public lands for which proposed actions have received separate approval (those proposals constituting level I, "No Action Alternative," in Chapter I). Expansion of the mining sector will further stimulate the regional economy, and promote immigration of new residents, with consequences for all components of community infrastructure, and for the values, life-styles and relationships of the region's three cultures.

The population of the five-county area is projected to increase at an average annual rate of 2.6 percent between 1977 and 1980. Rapid growth will continue in most areas. An exception is San Juan County, where an end to the construction of several major projects will reduce the rate of population increase. In the 1980's population growth in the five counties will continue at an average of more than 2.5 percent a year. The fastest growing counties will be Sandoval and Valencia, eastern portions of which will develop primarily as suburbs of Albuquerque. The ES Region excludes these suburban areas and is projected to experience a lesser rate of growth between 1977 and 1990, averaging 2.2 percent annually over the thirteen-year period. Tables 2-26 and 2-27 detail projected populations for the five-county area and for those portions of the five counties which comprise the ES Region.

The growth projected for populations in northwestern New Mexico will result in increasing population densities in all areas. However, the number of inhabitants per square mile will still be less than the national average. The 12 persons per square mile which will be the five-county average in 1990 will be less than one-fourth the figure for the United States in 1977. Table 2-28 gives population densities for the five county area. The distribution of inhabitants between urban areas and rural areas will also change with continued population growth, the relative size of the former increasing at the expense of the latter because immigrants are expected to choose to settle in communities which possess more sophisticated facilities and well-developed services. Table 2-29 presents data for urban-rural population distributions for the years 1980, 1985, and 1990.

All major communities in the ES Region will experience significant population growth between 1977 and 1990. The largest relative increases will occur in the vicinity of planned new uranium mines and mills. The unincorporated community of Thoreau is projected to increase 240 percent in size in the thirteen-year period; this projection in part reflects

TABLE 2-26

## NUMBER OF INHABITANTS, FIVE-COUNTY AREA, 1977-1990

County	1977 <sup>a</sup>		1980 <sup>b</sup>		1985 <sup>b</sup>		1990 <sup>b</sup>	
	Population	Growth Rate	Population	Growth Rate	Population	Growth Rate	Population	Growth Rate
McKinley	58,000	2.9	63,150	2.1	70,050	2.1	77,900	
Rio Arriba <sup>c</sup>	28,100	1.8	29,600	1.8	32,360	1.8	35,400	
Sandoval	24,400	3.3	26,900	4.0	32,750	4.1	40,100	
San Juan	68,700	1.8	72,500	1.9	79,650	1.9	87,500	
Valencia	49,900	3.3	54,950	3.8	66,200	3.8	79,750	
Five Counties	229,100	2.6	247,100	2.6	281,010	2.7	320,650	

Sources: <sup>a</sup>Harbridge House, Inc., estimates on the basis of U.S. Department of Commerce, Bureau of the Census, Federal-State Cooperative Program for Population Estimates, Population Estimates, 1977.

<sup>b</sup>Harbridge House, Inc., estimates on the basis of population projections of University of New Mexico, Bureau of Business and Economic Research, with the exception of Rio Arriba County (c).

<sup>c</sup>University of New Mexico, Bureau of Business and Economic Research, Population to 1985 and Impact on Job Outlook, 1976.

TABLE 2-27

## NUMBER OF INHABITANTS, ES REGION, 1977-1990

County or Portion of County	1977 <sup>d</sup>		1980 <sup>e</sup>		1985 <sup>e</sup>		1990 <sup>e</sup>	
	Population	Percent of County	Population	Percent of County	Population	Percent of County	Population	Percent of County
McKinley	58,000	100.0	63,150	100.0	70,050	100.0	77,900	
Rio Arriba <sup>a</sup>	4,650	16.5	4,900	18.1	5,300	18.9	5,700	
Western <sup>b</sup>	3,600	14.8	4,250	15.8	5,400	16.5	6,100	
Sandoval <sup>c</sup>	68,700	100.0	72,500	100.0	79,650	100.0	87,500	
San Juan	27,400	54.9	30,350	55.2	35,350	53.4	40,950	
Valencia <sup>c</sup>	162,350	70.9	175,150	70.9	195,750	69.7	218,150	
ES Region								

Notes: <sup>a</sup>comprises Coyote and Jicarilla Census county divisions.

<sup>b</sup>comprises Cuba Census county division.

<sup>c</sup>comprises Fence Lake, Grants and Laguna Census county divisions.

Sources: <sup>d</sup>Harbridge House, Inc., estimates on the basis of U.S. Department of the Commerce, Bureau of the Census, Federal-State Cooperative Program for Population Estimates, Population Estimates, 1977.

<sup>e</sup>Harbridge House, Inc., estimates on the basis of population projections of University of New Mexico, Bureau of Business and Economic Research.



present plans of Phillips Uranium Corporation to develop housing for 600 persons on land at Thoreau (Phillips Uranium Corporation, 1978; U.S. Senate, 1977). The nearby locality of Prewitt will likewise experience growth, with its population of 400 rising to 850 by 1990. Crownpoint, in the center of present uranium exploration activity, is expected to grow by 3,500 residents by 1990, thereby doubling in size. Other communities in the ES Region will register relatively smaller gains, as shown in Table 2-30.

Although natural increase of the existing population will add to the number of inhabitants of the ES Region after 1977, the anticipated growth will entail immigration of new residents. One consequence of this immigration will be a proportionate rise in the Anglo percentage of the total population. It is estimated that 25 percent of the increase in the total number of inhabitants between 1977 and 1990 will result from immigration. This percentage translates into 13,425 migrants to the ES Region, and 22,900 migrants to the five-county area. Table 2-31 suggests the shift in sizes of racial and ethnic groups stemming from the addition of these new residents. This is a minimum estimate of the Anglo percentage of the population since it is likely that non-English speaking groups may be diminished by children who adopt English as a primary language. The table suggests that Anglos will retain their majority position in San Juan County, and form close to a majority in Valencia County by 1990.

Employment and income in the five-county area and the ES Region are projected to rise along with population. The total number of jobs in McKinley, Rio Arriba, Sandoval, San Juan and Valencia Counties will increase by approximately 3.7 percent a year between 1977 and 1990. As shown in Table 2-32, the sectors experiencing the greatest growth will be government and mining, while the trade and service sectors will grow at a rate almost equal to the average for all sectors. Counties with the largest gains in employment are projected to be Sandoval and Valencia, for which suburban growth in the vicinity of Albuquerque will be primarily responsible. Rio Arriba and San Juan Counties will evidence the slowest growth; the latter undergoing a slow-down as construction of the Navajo Indian Irrigation Project and the San Juan Power Plant ends.

Total personal income in the five county area will rise by 86.4 percent between 1977 and 1990, given continuation of existing trends. The greatest gains will be registered in the mining sector. As shown in Table 2-33, personal income from mining will increase by \$138.1 million, from \$95.2 million to \$233.3 million, and the portion of total personal income contributed by mining will rise from 16.8 percent to 22.3 percent. Other sectors will decline slightly in relative importance, with the exception of agriculture, due largely to the Navajo Indian Irrigation Project in San Juan County, and government. The government sector will remain the most important element in the five-county economy, both in employment -- 24.2 percent -- and income -- 24.3 percent. The rapid

TABLE 2-28

## POPULATION DENSITIES, FIVE-COUNTY AREA, 1977-1990

County	1977	1977	1977	1980 <sup>c</sup>	1980	1985 <sup>c</sup>	1985	1990 <sup>c</sup>	1990
	<u>Land Area<sup>a</sup></u> (in square miles)	<u>Population<sup>b</sup></u> (in # of persons)	<u>Density</u> <u>Population</u> (in persons per square mile)	<u>Population</u> (in # of persons)	<u>Density</u> <u>Population</u> (in persons per square mile)	<u>Population</u> (in # of persons)	<u>Density</u> <u>Population</u> (in persons per square mile)	<u>Population</u> (in # of persons)	<u>Density</u> <u>Population</u> (in persons per square mile)
McKinley	5,454	58,000	10.6	63,150	11.6	70,050	12.8	77,900	14.3
Rio Arriba	5,843	28,100	4.8	29,600	5.1	32,350	5.5	35,400	16.1
Sandoval	3,714	24,400	6.6	26,900	7.2	32,750	8.8	40,100	10.8
San Juan	5,500	68,700	12.5	72,500	13.1	79,650	14.5	87,500	15.9
Valencia	5,656	49,900	8.8	54,950	9.7	66,200	11.7	79,750	14.1
Five Counties	26,167	229,100	8.8	247,100	9.4	281,000	10.7	320,650	12.3

Sources: <sup>a</sup> University of New Mexico, Bureau of Business and Economic Research, New Mexico Statistical Abstract, 1977.

<sup>b</sup> Harbridge House, Inc., estimates on the basis of U.S. Department of Commerce, Bureau of the Census, Federal-State Cooperative Program for Population Estimates, Population Estimates, 1977.

<sup>c</sup> Harbridge House, Inc., estimates on the basis of population projections of University of New Mexico, Bureau of Business and Economic Research.

TABLE 2-29

URBAN-RURAL, POPULATION DISTRIBUTION, FIVE-COUNTY AREA, 1977-1990

<u>County</u>	<u>Year</u>	<u>Urban Population</u>	<u>Percent of County Total</u>	<u>Rural Population</u>	<u>Percent of County Total</u>	<u>Total Population</u>	<u>Percent of County Total</u>
McKinley	1977	26,100	45.0	31,900	55.0	58,000	100.0
	1980	29,250	46.3	33,900	53.7	63,150	100.0
	1985	32,600	46.5	37,450	53.5	70,050	100.0
	1990	36,850	47.3	41,050	52.7	77,900	100.0
Rio Arriba	1977	5,600	19.9	22,500	80.1	28,100	100.0
	1980	9,200	31.1	20,400	68.9	29,600	100.0
	1985	12,400	38.3	19,950	61.7	32,350	100.0
	1990	16,000	45.2	19,400	54.8	35,400	100.0
Sandoval	1977	0	0.0	24,400	100.0	24,400	100.0
	1980	0	0.0	26,900	100.0	26,900	100.0
	1985	0	0.0	32,750	100.0	32,750	100.0
	1990	0	0.0	40,100	100.0	40,100	100.0
San Juan	1977	39,900	58.1	28,800	41.9	68,700	100.0
	1980	44,250	61.0	28,250	39.0	72,500	100.0
	1985	51,600	64.8	28,050	35.2	79,650	100.0
	1990	57,650	65.9	29,850	34.1	87,500	100.0
Valencia	1977	18,900	37.9	31,000	62.1	49,900	100.0
	1980	24,050	43.8	30,900	56.2	54,950	100.0
	1985	28,250	42.7	37,950	57.3	66,200	100.0
	1990	32,700	41.0	47,050	59.0	79,750	100.0
Five Counties	1977	90,500	39.5	138,600	60.5	229,100	100.0
	1980	106,750	43.2	140,350	56.8	247,100	100.0
	1985	124,850	44.4	156,150	55.6	281,000	100.0
	1990	143,200	44.7	177,450	55.3	320,650	100.0

Source: Harbridge House, Inc., 1978, utilizing definitions of, and information from, the U.S. Department of Commerce, Bureau of the Census.

TABLE 2-30

## NUMBER OF INHABITANTS OF MAJOR COMMUNITIES, ES REGION, 1977-1990

Community	1977 <sup>a</sup> Number of Inhabi- tants	Percent of County Total	1980 <sup>d</sup> Number of Inhabi- tants	Percent of County Total	1985 <sup>d</sup> Number of Inhabi- tants	Percent of County Total	1990 <sup>d</sup> Number of Inhabi- tants	Percent of County Total
<b>MCKINLEY COUNTY</b>								
Crownpoint (U)	3,500	6.0	4,800	7.6	5,650	8.1	7,000	9.0
Gallup (C)	18,400	31.7	20,150	31.9	22,150	31.5	24,550	31.5
Prewitt (U)	400	0.7	550	.9	700	1.0	850	1.1
Thoreau (U)	720	1.2	1,700	2.7	1,900	2.7	2,450	3.1
Zuni Pueblo (U)	4,200	7.2	4,300	6.8	4,850	6.9	5,300	6.8
<b>SANDOVAL COUNTY</b>								
Cuba (V)	550	2.3	600	2.2	650	2.0	750	1.9
<b>SAN JUAN COUNTY</b>								
Aztec (C)	4,650	6.8	5,800	8.0	6,650	8.2	8,150	9.3
Bloomfield (V)	2,200	3.2	2,650	3.7	2,950	3.7	3,500	4.0
Farmington (C)	29,750	43.3	32,650	45.0	35,650	44.8	39,050	44.6
Shiprock (U)	5,500	8.0	5,800	8.0	6,350	8.0	6,950	7.9
<b>VALENCIA COUNTY</b>								
Grants (C)	9,900	19.8	13,500	24.6	15,350	23.2	17,600	22.1
Milan (V)	3,000	6.0	4,200	7.6	4,950	7.5	5,900	7.4

**Notes:** (U), unincorporated  
(C), incorporated as city  
(V), incorporated as village

**Source:** <sup>a</sup>Harbridge House, Inc., estimates on the basis of New Mexico Employment Security Commission, New Mexico Annual Planning Report, Fiscal Year 1979, 1978, except for Crownpoint, Prewitt, and Thoreau (b) and Shiprock (d), as noted.

<sup>b</sup>McKinley Area Council of Governments, Overall Economic Development Program, 1977.

<sup>c</sup>William F. Turney and Associates, U.S. Bureau of Reclamation-Navajo Tribal Utility Authority Water Study, 1976.

<sup>d</sup>Harbridge House, Inc., estimates on the basis of projections of University of New Mexico, Bureau of Business and Economic Research, and local governments.

growth of mining and the continued predominance of government, both traditionally high wage sectors, will help push up personal per capita income, as projected in Table 2-34. With the creation of the new jobs shown in Table 2-32, jobless rates are expected to drop, despite the immigration of workers from outside the region. Expansion of the economy will thus improve the standing of most residents.

The effects of projected economic growth on unemployment rates and per capita incomes among particular minority groups are difficult to predict. A number of variables will influence the extent to which joblessness in the ES Region falls, personal income rises, and different ethnic groups share in a growing economy. Among these factors are political attempts by federal, state, local, and tribal authorities to affect patterns of employment and earnings. One such attempt would be a national initiative to achieve "full employment." Likewise, the degree to which employers in the mining and other growing sectors prove willing to hire and train Indians and Hispanos will also have a major effect on employment and income distribution. Many Hispanic and Indian residents of northwestern New Mexico now perceive a pattern of discrimination against them. In the 110 interviews with key informants in the ES Region, 20 percent of all respondents and 35 percent of Indians interviewed believed that projected employment opportunities would not apply to them because of employer prejudice. Such discrimination, if not actually practiced on a large scale, would obviously have a major impact on an economy in which more than half of all workers are either Hispanic or Indian.

In numerous training and education programs, the Bureau of Indian Affairs (BIA) and the Navajo Nation are attempting to end the existing isolation of rural Navajo from employment and earnings opportunities. Already, uranium mining companies have developed programs with the tribe to provide on-the-job training for Navajo. Half of the salaries of Navajo workers are paid for out of funds received as federal grants-in-aid. Present plans are for expansion of these programs. In addition the construction of a vocational education center, the Navajo Skill Center, is under way. The center will be designed to give Indians the skills and the confidence to take and hold jobs in all aspects of resource extraction. Similar efforts are being made under Indian auspices to educate Navajos to operate essential support systems, such as those for water supply, wastewater treatment and solid waste disposal. The success of these experimental programs would help to integrate Indians into the regional economy and would end the dichotomy of a pastoral economy existing in isolated rural and reservation areas, and a modern, industrial economy thriving on urban areas.

Integration of rural Navajo and other Indians into the developing industrial economy of northwestern New Mexico will improve these groups' relative economic position. But in the process, it will undermine the basis of another group long important in the ES Region, the operators of

TABLE 2-31

PERCENTAGES OF TOTAL NUMBER OF INHABITANTS BY PRIMARY LANGUAGE SPOKEN,  
FIVE COUNTY AREA, 1977-1990

<u>County</u>	<u>Year</u>	<u>Speaking English</u>	<u>Speaking Spanish</u>	<u>Speaking an Indian Language</u>	<u>Other</u>	<u>Total</u>
McKinley	1977	30.8	9.7	58.8	.7	100.0
	1990	34.3	9.2	55.8	.7	100.0
Rio Arriba	1977	15.7	68.9	15.1	.3	100.0
	1990	15.2	69.3	15.2	.3	100.0
Sandoval	1977	28.5	31.8	39.0	.7	100.0
	1990	33.9	29.3	36.1	.7	100.0
San Juan	1977	58.7	6.5	34.0	.8	100.0
	1990	60.5	6.2	32.5	.8	100.0
Valencia	1977	45.3	39.8	13.9	1.0	100.0
	1990	49.7	36.6	12.8	.9	100.0
Five Counties	1977	39.9	25.8	33.4	.9	100.0
	1990	43.1	24.4	31.8	.7	100.0

Source: Harbridge House, Inc., projections based on figures from U.S. Department of Commerce, Bureau of the Census, Census of Population: 1970, Characteristics of the Population; New Mexico, 1973.

trading posts. As Indian employment and income rise, as mines and related facilities are established in previously isolated areas, as roads and other elements of community infrastructure are improved, traders will lose much of their historical importance. Indians will be wealthier, more independent, and better able to travel to urban shopping centers where a better selection of merchandise is available at lower cost. The economic rationale of the trading post will be diminished with the decline of the region's traditional, pastoral economy.

Projected population growth and economic expansion in the ES Region will require large-scale investment in, and maintenance of, community infrastructure. Existing urban areas will need to hire more personnel and to expand programs of all types; adjacent undeveloped districts will urbanize, making necessary installation of entirely new facilities and services. To accomplish the expansion of existing systems and construction of new systems, local governments will have to increase levels of spending by more than 41 percent in the late 1970's and early 1980's. Previous studies of the costs to county, school district, and municipal governments of an additional thousand residents suggest that capital outlays will rise by approximately \$3.6 million per thousand new inhabitants --in constant 1977 dollars -- while operational budgets will grow by \$600,000 per thousand annually (U.S. Environmental Protection Agency, 1977; THK Associates, Inc., 1974).

Given a projected increase of 91,550 in the population of the five-county area between 1977 and 1990, necessary expenditures for capital projects will climb by nearly \$330 million in thirteen years, and costs of operation and maintenance of established programs will constitute an additional \$54.9 million each year by 1990. Although most types of taxes will also increase, it is expected that gains in revenues will lag behind needs for expenditure. Localities must accommodate demands for services as they occur, rather than after additional tax receipts make accommodation easy. Impacts from economic development and population immigration are usually immediate, and always precede increases in tax revenues since newly hired workers and newly arrived families need almost at once to use roads, to obtain shelter, to enroll school-aged children, and to draw on the entire range of public services.

To meet the needs of a growing population, local governments in the ES Region will borrow up to constitutional limits, raise mill levies to legal maximums, and appeal for federal and state assistance. Although statutes of the State of New Mexico provide for aid to localities in areas of minerals resource development, assistance is usually tied to severance tax receipts. Collection of severance taxes begins after mines have entered into production -- and after communities have already experienced the economic stimulus and immigration associated with the original investment in the mine. Thus, disbursement of severance taxes does not meet the need for immediate, front-end assistance. In the short term, localities in northwestern New Mexico appear to lack an adequate source of increased financing.



TABLE 2-32

## NUMBER OF WORKERS EMPLOYED, FIVE-COUNTY AREA, 1990

Sector	McKinley County		Rio Arriba County		Sandoval County		San Juan County		Valencia County		Five-County Area	
	No. of Workers	Annual % Growth 1977-1990	No. of Workers	Annual % Growth 1977-1990	No. of Workers	Annual % Growth 1977-1990	No. of Workers	Annual % Growth 1977-1990	No. of Workers	Annual % Growth 1977-1990	No. of Workers	Annual % Growth 1977-1990
Agriculture	160	0.2	400	(3.0)	565	(2.9)	1,375	7.0	635	(1.9)	3,135	1.0
Mining	5,960	2.4	40	0.0	370	18.2	2,240	(1.0)	7,085	8.8	15,695	4.0
Metal	5,220	1.7	--	--	--	--	270	a	6,780	8.7	12,270	5.0
Petroleum	20	0.0	35	(1.2)	20	0.0	1,560	(1.6)	80	0.0	1,715	(1.6)
Coal	490	0.9	--	--	300	a	320	0.0	--	--	1,110	0.5
Construction	1,100	4.2	280	0.3	1,510	10.3	4,575	(0.2)	1,430	6.4	8,815	2.2
Manufacturing	1,430	1.7	420	0.0	2,280	6.1	1,700	3.3	795	8.5	6,545	3.9
Transportation, Communi- cations & Utilities	1,240	1.6	230	0.0	630	11.5	3,810	2.3	1,330	3.4	7,240	2.8
Trade	5,210	2.6	1,065	0.0	1,000	7.5	6,630	1.8	6,245	8.0	20,150	3.6
Finance, Insurance & Real Estate	505	3.2	310	3.2	425	4.2	965	2.4	910	6.0	3,115	3.7
Services	5,540	4.2	1,515	1.0	2,230	7.5	6,665	1.4	3,325	8.2	19,275	3.6
Government	9,390	5.0	3,700	3.4	1,815	3.9	6,745	3.9	5,230	5.5	26,880	4.7
Total	30,535	3.6	7,880	1.8	10,745	5.9	34,705	1.8	26,985	6.8	110,850	3.7

Note: <sup>a</sup> 1977 figure was zero.

Source: Harbridge House, Inc., estimates on the basis of 1970-1977 trends in data supplied by New Mexico Employment Security Commission, and 1970-75 trends in data from U.S. Department of Commerce, Bureau of Economic Analysis.

TABLE 2-33

VALUE OF TOTAL PERSONAL INCOME, FIVE-COUNTY AREA, 1990  
(in thousands of 1975 dollars)

Sector	McKinley County		Rio Arriba County		Sandoval County		San Juan County		Valencia County		Five-County Area	
	Total Income	Percent of Total	Total Income	Percent of Total	Total Income	Percent of Total	Total Income	Percent of Total	Total Income	Percent of Total	Total Income	Percent of Total
Agriculture	3,425	1.0	2,760	2.7	3,925	6.1	7,370	2.0	12,050	6.9	29,530	2.8
Mining	101,500	29.8	1,550	1.5	6,680	10.3	76,615	21.0	46,990	26.8	233,335	22.2
Construction	18,725	5.5	4,400	4.2	4,960	7.7	65,405	17.9	11,960	6.8	105,450	10.0
Manufacturing	16,560	4.9	5,850	5.6	8,590	13.3	12,960	3.5	3,535	2.0	47,495	4.5
Transportation, Communi- cations & Utilities	19,520	5.7	5,290	5.1	2,550	3.9	50,510	13.8	19,150	10.9	97,020	9.2
Trade	55,640	16.3	13,130	12.6	5,370	8.3	51,720	14.2	23,480	13.4	149,340	14.2
Finance, Insurance & Real Estate	6,130	1.8	3,325	3.2	6,415	9.8	9,060	2.5	7,180	4.1	32,110	3.1
Services	21,105	6.2	24,880	23.9	8,865	13.7	30,125	8.2	15,800	9.0	100,775	9.6
Government	98,355	28.8	42,880	41.2	17,440	26.9	61,605	16.9	35,260	20.1	255,540	24.3
Total	340,960	100.0	104,065	100.0	64,795	100.0	365,370	100.0	175,405	100.0	1,050,595	100.0

Source: Harbridge House, Inc., estimates on the basis of 1970-1975 trends in data supplied by U.S. Department of Commerce, Bureau of Economic Analysis.



Already, local governments in the ES Region are operating with large deficits. These deficits are expected to grow. Officials in most parts of the region are drawing up detailed statements of the needs of their communities, with little assurance that funds to satisfy those needs can be obtained. The following paragraphs suggest the scope of their problem; whether or not projected personnel and facility requirements will be met is uncertain.

Highways in the ES Region are presently carrying loads which approach or exceed design specifications. As shown in Table 2-14, 24.2 percent of roads in northwestern New Mexico are deteriorated and are considered to be deficient in terms of safety or physical condition by the New Mexico Highway Department (New Mexico Highway Department, 1977b). Highways will not be greatly improved in the period, 1977-1990. Recent trends indicate that each additional inhabitant of the ES Region is associated with 1.1 more automobiles. Therefore, the number of cars and trucks is projected to increase by 64.6 percent between 1977 and 1990, as an estimated 61,000 more motor vehicles are added to traffic. These additional automobiles will require accelerated maintenance of existing roads and construction of new highways. Both have proceeded slowly in the past.

Present budgets do not provide for correction of all identified deficiencies in conditions of major roads in the ES Region. Other problems are beyond the responsibilities of the federal and state agencies which have traditionally devoted funds and personnel to maintaining the region's roads. In municipalities like Aztec, Bloomfield, and Milan as much as 70 percent of streets are unpaved; paved streets are reportedly in poor condition and large-scale capital improvements are necessary (New Mexico Energy Resources Board, 1977). In Farmington, where streets are generally well maintained, traffic congestion is often severe, and plans are being formulated for a mass transit system to relieve the pressure on downtown roads. Gallup is likewise weighing the expansion of its limited bus line. Both cities are turning to mass transit alternatives due to geographic constraints on the construction of new access routes and additional city streets.

Population growth after 1977 will create new demands for housing through the ES Region. As shown in Table 2-35, the housing supply would have to grow by 50.5 percent to satisfy the need for 23,770 new homes. In addition, approximately 10 to 15 percent of existing units will need to be replaced because of age and deterioration. Without the projected increases in populations, communities like Gallup would find necessary replacement of substandard units difficult. With large numbers of additional inhabitants to house as well, the task will be extremely difficult. Local authorities appear to be relying on private initiative and investment, although, as previously discussed, such reliance has been misplaced in the past. Because of limitations on construction of conventional dwellings, mobile homes will account for a majority of additional units. Recent experience in Grants suggests that 80 percent of all new housing will consist of mobile homes. For the ES Region, this percentage equals 19,000 more mobile homes by 1990.

TABLE 2-34

## PER CAPITA INCOMES, FIVE-COUNTY AREA, 1977-1990

County	1977 <sup>a,b</sup>	1980 <sup>a,b</sup>	1985 <sup>a,b</sup>	1990 <sup>a,b</sup>	Annual Percent
					Change 1977-1990
McKinley	4,362	4,753	5,465	6,329	2.9
Rio Arriba	3,743	3,995	4,675	5,270	2.7
Sandoval	3,401	3,717	4,146	4,625	2.2
San Juan	5,180	5,693	6,664	7,801	3.2
Valencia	4,620	5,123	6,086	7,230	3.5
Five Counties	4,494	4,908	5,706	6,625	3.0

Note: <sup>a</sup>figures in constant 1977 dollars.

Source: <sup>b</sup>based on 1970-1975 trends in unpublished computer printouts of U.S. Department of Commerce, Bureau of the Census.

TABLE 2-35

## HOUSING NEEDS, ES REGION, 1977-1990

Area	1977 Population <sup>b</sup>	Needed Housing Units <sup>a</sup>	1980 Population <sup>b</sup>	Needed Housing Units <sup>a</sup>	1985 Population <sup>b</sup>	Needed Housing Units <sup>a</sup>	1990 Population <sup>b</sup>	Needed Housing Units <sup>a</sup>
McKinley County	58,000	13,800	63,150	15,785	70,050	18,435	77,900	21,640
Rio Arriba County- Coyote & Jicarilla CCD's	4,650	1,165	4,900	1,290	5,300	1,470	5,700	1,675
Sandoval County- Cuba CCD	3,600	860	4,250	1,120	5,400	1,500	6,100	1,795
San Juan County	68,700	17,615	72,500	19,595	79,650	22,760	87,500	26,515
Valencia County- Fence Lake, Grants & Laguna CCD's	27,400	7,210	30,350	8,430	35,350	10,400	40,950	12,795
ES Region	162,350	40,650	175,150	46,220	195,750	54,565	218,150	64,420

Note: <sup>a</sup>housing units calculated on estimated average household size, calculated from projections of U.S. Department of Commerce, Bureau of the Census.

Source: <sup>b</sup>Harbridge House, Inc., estimates on the basis of figures and projections of University of New Mexico, Bureau of Business and Economic Research.

Most community services will require expansion in order to accommodate population growth. Table 2-36 shows requirements of educational systems for additional personnel. Already public school districts in northwestern New Mexico are operating over or near the design capacities of schools, and temporary units have been put in place to accommodate the overflow from permanent facilities. Because of the expense of the construction of schools, most of the classrooms which must be added to systems between 1977 and 1990 will be modular or trailer units. Health care systems will also require expansion of facilities, although McKinley County already has a sufficient number of hospital beds to satisfy projected demand to 1990, and to meet most needs of the ES Region. Table 2-37 shows the challenge for health care planners concerning staffing, and the requirements for trained personnel: an additional 348 doctors, 1,079 nurses, and 125 dentists.

Police and fire protection in the ES Region is presently adequate. However, to maintain that adequacy state, county and local governments will have to make many new hires, as shown in Table 2-38, as well as build additional fire stations and purchase additional fire-fighting equipment. Likewise, new water supply and wastewater treatment systems will be necessary, as requirements for water in the ES Region surpass 29 million gallons per day, and needs for water treatment exceed 9.3 million gallons per day as detailed in Table 2-39. Although installation of new solid waste disposal sites is not expected to be a problem, all of the sites now in use will require replacement by 1990 (see Table 2-23). Similarly, supplies of electrical power and natural gas will grow relatively more expensive, but are projected to be ample in the Four Corners area.

Since immigration comparable to that which has been taking place in the ES Region is expected to continue into the future, trends in cultural values, beliefs, attitudes, and expectations of residents should continue as well. Social change occurring among Indian and Hispanic groups may intensify as more Anglo workers with different beliefs, lifestyles and expectations enter northwestern New Mexico. The pressures and conflicts which can be expected to occur, based on current trends, will vary according to the present social and cultural composition of particular parts of the ES Region. In the subsections which follow, the changes likely to affect Anglo, Hispanic, and Indian residents of the area communities will be separately discussed after a discussion of all responses to the key informants survey.

When all 110 responses to key informant interviews in northwestern New Mexico are tabulated, perceptions of how future development will affect individuals and their communities encompass a broad range. These perceptions are profiled in Table 2-40. Sixty-five percent of respondents believed that immigrants to the region would be different from present residents, compared to 21 percent who thought they would be

TABLE 2-36

## PUBLIC EDUCATIONAL SYSTEMS REQUIREMENTS, ES REGION, 1990

<u>School District</u>	<u>1990 School Age Population<sup>a</sup></u>	<u>Teachers<sup>b</sup> Number Needed by 1990</u>	<u>Percent Increase From 1977</u>	<u>Support Staff<sup>b</sup> Number Needed by 1990</u>	<u>Percent Increase From 1977</u>
MCKINLEY COUNTY					
Gallup-McKinley School District	19,475	927	54.3	438	335.4
RIO ARriba COUNTY					
Jemez Mountain School District	1,425	68	109.2	32	700.0
SANDOVAL COUNTY					
Cuba Independent School District	1,525	73	40.4	34	155.6
SAN JUAN COUNTY					
Aztec Public School District	2,780	132	35.4	62	287.5
Bloomfield Municipal School District	3,150	150	32.7	70	297.7
Central Consolidated School District	6,695	318	37.1	150	293.1
Farmington Public School District	9,255	440	35.2	208	288.1
VALENCIA COUNTY					
Grants Public School District	10,235	488	90.0	230	389.4
ES Region	54,540	2,596	51.8	1,234	321.4

Notes: <sup>a</sup> ratio applied at 25 percent of projected population, reduced to reflect smaller family sizes from 30 percent recommended by Environmental Protection Agency, Energy From the West, 1977.

<sup>b</sup> number needed and percent increase figures reflect accepted standards given in Table 2-17.

Source: Harbridge House, Inc. estimates on the basis of standards of New Mexico Department of Education and National Education Association.

pretty much the same, and 15 percent who expressed no opinion. Negative opinions of the newcomers outnumber positive attitudes toward them 2 to 1, the most common concerns being that the migrants were "transients" (30 percent) and "disrespectful" (30 percent). Likewise, respondents had more negative remarks to make about resource development than positive. While 25 percent of those who said they had been affected by the recent growth of the ES Region credited that growth with improving business and 16 percent felt it had created jobs, 16 percent remarked that it had increased traffic, 1 percent that it had strained public services, and 11 percent that it had increased crime and disorder. When asked whether the effects of development were generally positive or negative, 44 percent concluded that they were positive, but 35 percent that they were negative, with 21 percent unsure.

The Anglo inhabitants of northwestern New Mexico live for the most part in those few urban communities which will experience the greatest economic growth, bear the brunt of population immigration, and suffer related problems with community infrastructure. Aztec, Bloomfield, Farmington, Gallup, Grants, and Milan will record major population increases between 1976 and 2000 as local payrolls expand. Trends which have been observed in most of the communities of the ES Region will therefore continue as described in earlier portions of this chapter. Simply put, people with values, attitudes, beliefs and expectations associated with an urban lifestyle will enter traditionally small towns and rural settings. In addition, local governments are not accustomed to dealing with the numerous projected problems of rapid development. As newcomers arrive, they will expect that services and facilities available to them elsewhere in the nation be provided here. But lifelong residents accustomed to low taxes may resent the expensive demands of newcomers. The need to provide even the most necessary facilities may create conflicts between the native inhabitants and the new immigrants.

Anglo respondents to specially conducted interviews with key informants in the ES Region emphasized their liking for the present relaxed and informal character of their communities and their perception that this aspect of quality of life in the area was threatened by further development. Twenty-one percent of Anglos interviewed mentioned the small size and peaceful atmosphere as important features of the community they lived in; another 35 percent indicated that the friendliness and trustworthiness of their neighbors were also key aspects of life in the region. These residents fear that migrants to northwestern New Mexico will detract from the attractiveness of their communities. Sixty-three percent of Anglo respondents believed that newcomers responding to economic and employment opportunities created by new development were different from long-time residents. As Table 2-40 indicates, the most common perceptions of these differences was that new arrivals were "transients," and uncaring for the community, a feeling shared by 48 percent of those Anglos who believed that the immigrants would be

TABLE 2-37

## HEALTH CARE SYSTEMS REQUIREMENTS, ES REGION, 1990

Area	1990 Population	Physicians <sup>a</sup>		Registered Nurses <sup>a</sup>		Licensed Nurses <sup>a</sup>		Dentists <sup>a</sup>		Hospital Beds <sup>a</sup>	
		Number Needed by 1990	Percent Increase from 1977	Number Needed by 1990	Percent Increase from 1977	Number Needed by 1990	Percent Increase from 1977	Number Needed by 1990	Percent Increase from 1977	Number Needed by 1990	Percent Increase from 1977
McKinley County	77,900	126	100.0	300	300.0	90	16.9	45	221.4	311	(18.8) <sup>b</sup>
Rio Arriba County- Coyote & Jicarilla CCD's	5,700	9	-- <sup>c</sup>	22	2200.0	7	-- <sup>c</sup>	3	-- <sup>c</sup>	23	-- <sup>c</sup>
Sandoval County											
Cuba CCD	6,100	10	150.0	23	475.0	7	75.0	1	300.0	24	140.0
San Juan County	87,500	141	143.1	337	836.1	101	102.0	51	121.7	350	87.2
Valencia County- Pence Lake, Grants & Laguna CCD's	40,950	66	842.9	158	38500.0	47	1075.0	24	700.0	164	281.4
ES Region	218,150	352	166.7	839 <sup>d</sup>	478.6	250 <sup>d</sup>	85.2	127 <sup>d</sup>	209.8	872	40.0

Note: <sup>a</sup>The only areas where facilities met standards given in Table 2-19 were in Licensed Nurses and Hospital Beds in McKinley County.

<sup>b</sup>by 1990, McKinley County will still have a surplus over accepted standards of 18.8 percent.

<sup>c</sup>There were none for that area in 1977.

<sup>d</sup>ES Region totals may not add due to rounding.

Source: Harbridge House, Inc., based on population projections for 1990 (see Table 2-27) for the ES Region, and standards of American Medical Association and U.S. Department of Health, Education, and Welfare.



different from long-time inhabitants. Anglo respondents also perceived that projected migration will entail major problems for local governments in attempting to expand community services and facilities and manage other aspects of rapid growth.

As cities and towns in the ES Region grow, present conflicts between long-time Anglo residents and liberal Anglo newcomers will intensify. At present, newcomers are a minority and are generally viewed with tolerance by the older residents. However, as their numbers increase, newcomers will be able to effectively influence local decision-making. Should they press for action in planning, land use controls, better minority representation in local government, pollution control standards, and improvements in public services and school systems, long-time residents may react less tolerantly. Politically divisive issues may develop around questions of levels and taxation and public expenditure, government regulation, and long-range planning.

At present, Hispanic-Americans in the ES Region appear to be in the midst of transition from predominantly rural to predominantly urban lifestyles. This trend is likely to continue for Hispanics as they relocate to urban areas in response to job opportunities. However, the possibility of employment at planned resource developments in the ES Region may enable some Hispanics to continue to live in some nearby rural areas they might otherwise have been forced to leave. For example, two Hispanic respondents to the key informant interviews are currently employed at uranium mines near Grants and run cattle part time. Another in the Cuba area discussed his neighbors who commute to uranium mines near Laguna on a weekly basis but return to their ranches on weekends. Such arrangements may become more common in the future if Hispanics can obtain resource-related employment.

However, to the extent that Hispanics are able to obtain work, they will need to employ the English language and adopt Anglo customs. If they do not obtain such employment, they may be forced to leave the ES Region altogether in order to get jobs. Even those Hispanics who are able to pursue traditional life-styles will find their communities becoming more Anglo with time, as the percent represented by the English language speakers increases. Thus, it is likely that traditional rural Hispanic culture will break down, as more Hispanics become drawn into the Anglo wage-work society and more Anglos into Hispanic areas. But, as the information in Table 2-40 indicates, the most Hispanic respondents to the key informant interviews did not view the effects of future development negatively. In their responses, they emphasized the ways in which growth would add to business income and job opportunities, and most did not mention adverse effects on cultural values or ethnic conflicts.

Among Indians, the need for wage employment will increase as populations expand. Current and planned on-reservation projects will be insufficient to provide employment to the large number of Indians in need

TABLE 2-38

## POLICE AND FIRE PROTECTION REQUIREMENTS, ES REGION, 1990

Area	1990 Population	Policemen <sup>a</sup> No. Needed by 1990	Percent Increase From 1977	Firemen <sup>a</sup> No. Needed by 1990	Percent Increase From 1977
McKinley County	77,900	156	-- <sup>b</sup>	139	23.0
Rio Arriba County- Coyote & Jicarilla CCD's	5,700	11	340.0	10 <sup>c</sup>	-- <sup>c</sup>
Sandoval County- Cuba CCD	6,100	12	71.4	11	-- <sup>b</sup>
San Juan County	87,500	175	19.5	156	-- <sup>b</sup>
Valencia County- Fence Lake, Grants & Laguna CCD's	40,950	82	100.0	73	65.9
ES Region	218,150	436	19.2	389	-- <sup>c</sup>

Notes: <sup>a</sup> number needed and percent increase figures reflect accepted standards given in Tables 2-20 and 2-21.

<sup>b</sup> local staffing in 1977 exceeded standards for 1990 population requirements in some areas.

<sup>c</sup> no firemen reported locally in 1977.

Source: Harbridge House, Inc., estimates on the basis of standards of Federal Bureau of Investigation and International City Management Association.

TABLE 2-39

## WATER SUPPLY AND WASTEWATER TREATMENT REQUIREMENTS, ES REGION, 1990

Area	1990 Population	Water Supply <sup>a</sup> Average Use by 1990 (gallons/day)	Percent Increase From 1977	Wastewater <sup>b</sup> Treatment Average Use By 1990 (gallons/day)	Percent Increase From 1977
McKinley County	77,900	12,931,400	189.5	4,267,300	130.0
Rio Arriba County- Coyote & Jicarilla CCD's	5,700	370,500	c	122,300	c
Sandoval County- Cuba CCD	6,100	396,500	361.9	130,800	86.9
San Juan County	87,500	14,525,000	25.2	4,793,300	19.5
Valencia County- Fence Lake, Grants & Laguna CCD's	40,950	6,797,700	94.2	2,243,200	5.6
ES Region	218,150	35,021,100	82.9	11,556,900	60.2

Notes: <sup>a</sup> use calculated using weighted average of urban and rural per capita rates for New Mexico.

<sup>b</sup> use calculated at .333 of water supplies.

<sup>c</sup> no systems existing in 1977.

Source: Harbridge House, Inc., estimates on basis of information supplied by municipalities, consistent with New Mexico Energy Resources Board, Managing the Boom in Northwestern New Mexico, 1972.



of work. Therefore, the migration patterns on reservations and from the reservations to urban areas will continue. The pressure upon Indians who work and live in off-reservation areas to accept Anglo values and beliefs will be great. As increasing numbers of the Indians find themselves in that situation, they will face strong pressures to conform to Anglo customs and lifestyles. No longer a part of traditional Indian cultures, living in off-reservation, urban areas and not regarded as members of the predominant Anglo society, these people will face severe social strains resulting in increased rates of alcoholism and drug abuse (Savard, 1968).

Of all respondents to key informant interviews in the ES Region, Indians were most likely to note significant change already occurring in their traditional culture and lifestyle as a result of development. For example, 92 percent of Indian respondents said that newcomers to the area were different from long-time residents (see Table 2-40). Newcomers were also viewed as having an adverse impact on the community. Of all Indian respondents, 62 percent said the newcomers were "disrespectful." Other objections mentioned included "strange" and "different" (38 percent), "rough" and "more prone to violence" (25 percent), "deceitful" (14 percent), "wasteful" (13 percent), and "prejudiced" (13 percent). Thus, of the three cultural and ethnic groups in the study area, effects of immigration are apparently being the most strongly felt by Indians, especially the Navajo. As population growth and economic development continues, such impacts will multiply.

While 19 percent of Indians interviewed felt that existing energy developments had helped to provide them employment or business opportunities, enabling them to earn needed cash while living in their traditional setting, others feared that mining was ruining their land (31 percent) and depleting their water (19 percent). Fifteen percent of the Indians interviewed said that the actions of mining companies on the lands around them filled them with "apprehension." They indicated that the gouging of the earth and extraction of minerals was unholy and a desecration of a basic element in their love of the Four Corners area. It should be noted, however, that a majority (51 percent) of Indian respondents have yet to experience much development in or near their communities. They were unable to anticipate very many positive or negative aspects of economic growth and population immigration in the future.

TABLE 2-40

ATTITUDES TOWARD RESOURCE DEVELOPMENT AND RELATED IMMIGRATION,  
ES REGION, 1977

<u>Perceived Effects of Resource Development</u>	<u>All</u>	<u>Anglo</u>	<u>Hispano</u>	<u>Indian</u>
None	67	46	15	6
Overload of public facilities	20	13	1	6
Improvement in business	17	10	5	2
Creation of jobs	10	3	4	3
Increases in traffic	9	8	1	0
Overcrowding or destruction of land	9	1	0	8
Shortages of housing	8	7	1	0
Increase in crime	7	2	1	4
Other	13	9	2	2

Perceived  
Characteristics of Immigrants

Similar to native residents	20	13	5	2
Different	58	27	7	24
Transient	16	13	0	3
Disrespectful	16	0	0	16
Liberal, community-minded	12	7	3	2
Strange	9	0	0	9
Rough or violent	8	1	0	7
Other	36	16	8	12

Note: 110 respondents gave multiple responses. Of all respondents, 44 were Anglos, 17 were Hispanos, and 49 were Indians.

Source: Harbridge House, Inc., interview with key informants, 1977.

CHAPTER 3

ASSESSMENT OF IMPACTS

TABLE 3-1

NUMBER OF INHABITANTS, FIVE-COUNTY AREA, 1977-1990, WITH PROPOSED ACTIONS

County	1977 <sup>a</sup> Population	1977-1980 Annual Growth Rate	Percent Increase w/ Proposed Actions	1980 <sup>b</sup> Population	1980-1985 Annual Growth Rate	Percent Increase w/ Proposed Actions	1985 <sup>b</sup> Population	1985-1990 Annual Growth Rate	Percent Increase w/ Proposed Actions	1990 <sup>b</sup> Population
McKinley	58,000	3.7	2.5	64,750	2.1	2.8	72,000	2.3	3.5	80,600
Rio Arriba <sup>c</sup>	28,100	1.8	0.0	29,600	1.8	0.0	32,350	1.8	0.0	35,400
Sandoval	24,400	3.4	0.2	26,950	4.0	0.6	32,800	4.1	0.4	40,250
San Juan	68,700	2.6	2.4	74,250	1.9	2.5	81,650	2.0	3.3	90,350
Valencia	49,900	3.5	0.7	55,350	3.8	1.0	66,850	3.8	0.8	80,400
Five Counties	229,100	3.1	1.5	250,900	2.6	1.7	285,650	2.7	2.0	327,000

**Source:** <sup>a</sup>Harbridge House, Inc., estimates on the basis of U.S. Department of Commerce, Bureau of the Census, Federal-State Cooperative Program for Population Estimates, Population Estimates, 1977.

<sup>b</sup>Harbridge House, Inc., estimates on the basis of population projections of University of New Mexico, Bureau of Business and Economic Research, with the exception of Rio Arriba County.

<sup>c</sup>University of New Mexico, Bureau of Business and Economic Research, Population to 1985 and Impact on Job Outlook, 1976.

TABLE 3-2

NUMBER OF INHABITANTS, ES REGION, 1977-1990, WITH PROPOSED ACTIONS

County or Portion of County	1977 <sup>d</sup> Population	1977-1980 Annual Growth Rate	Percent Increase w/ Proposed Actions	1980 <sup>e</sup> Population	1980-1985 Annual Growth Rate	Percent Increase w/ Proposed Actions	1985 <sup>e</sup> Population	1985-1990 Annual Growth Rate	Percent Increase w/ Proposed Actions	1990 <sup>e</sup> Population
McKinley	58,000	3.7	2.5	64,750	2.1	2.8	72,000	2.3	3.5	80,600
Rio Arriba- Western <sup>a</sup>	4,650	1.1	0.0	4,900	1.6	0.0	5,300	1.5	0.0	5,700
Sandoval <sup>c</sup>	3,600	6.1	1.2	4,300	4.9	1.8	5,450	2.8	2.5	6,250
San Juan	68,700	2.6	2.4	74,250	1.9	2.5	81,650	2.0	3.3	90,350
Valencia- Western <sup>c</sup>	27,400	3.9	1.3	30,750	3.0	1.4	35,650	3.1	1.6	41,600
ES Region	162,350	3.3	2.2	178,950	2.3	2.3	200,050	2.3	2.9	224,500

**Notes:** <sup>a</sup>comprises Coyote and Jicarilla Census County Divisions.

<sup>b</sup>comprises Cuba Census County Division.

<sup>c</sup>comprises Fence Lake, Grants, and Laguna Census County Divisions.

**Source:** <sup>d</sup>Harbridge House, Inc., estimates on the basis of U.S. Department of Commerce, Bureau of the Census, Federal-State Cooperative Program for Population Estimates, Population Estimates, 1977.

<sup>e</sup>Harbridge House, Inc. estimates on the basis of population projections of the University of New Mexico, Bureau of Business and Economic Research.

## CHAPTER III

### ASSESSMENT OF IMPACTS

#### SOCIOECONOMIC CONDITIONS

The proposed actions would have short- and long-term social and economic impacts on communities in northwestern New Mexico. Short-term and temporary impacts would result from the construction and development phases of coal mines and related facilities. During these phases, transient labor forces would be employed and material purchased to construct operational features of each project. Socioeconomic impacts stemming from expenditures for these purposes would be limited to duration of construction and development, projected at between 1 and 10 years at different sites. Long-term impacts would be tied to the subsequent operation of planned facilities, some of which would have design lives of forty years and more. Hiring and spending during the operation-phase would provide the regional economy with a sustained stimulus, promoting lasting gains in employment and permanent immigration of workers and their families.

However, long-term impacts would ultimately end with abandonment of mines and closing of related facilities. The proposed actions have different end dates. Overall, employment is projected to reach its peak in 1989 while production would begin to decline in the 1990's. Long-term social and economic impacts discussed below would therefore not necessarily be permanent, insofar as the basis of those impacts would eventually be removed. However, they have generally been treated as permanent in the analysis below for two reasons. The first is that impacts would extend over half a century; for most residents of northwestern New Mexico, they would be permanent for all intents and purposes. The second is that a portion of increases in population, gains in employment and income, expansion of community infrastructure, and changes in social and cultural characteristics would persist after the termination of leases and permits. The process of growth and change is to some extent linear, and would not be entirely reversed.

Impacts are analyzed below for 1980, 1985, and 1990. Figures for the latter have been presented in greatest detail, since of the three years, projections for 1990 with the proposed actions evidence the greatest relative change from projections of the future in the absence of the proposals. Therefore, impacts in 1990 have been assessed as representing maximum levels and have been examined in the "worst-case analyses." Where impacts in prior years would be distinctive and significant, they have been explored separately. Nineteen-eighty would fall largely during the construction and development phases of projects, while 1985 would be a year of transition, with several mines in production. With the exception of the New Mexico Generating Station at Bisti, 1990 would occur during the operation phases of all projects.

TABLE 3-3

## URBAN-RURAL POPULATION DISTRIBUTION, FIVE-COUNTY AREA, 1977-1990, WITH PROPOSED ACTIONS

County	Year	Urban Population	Percent of County Total	Percent Increase w/ Proposed Actions	Rural Population	Percent of County Total	Percent Increase w/ Proposed Actions	Total Population	Percent Increase w/ Proposed Actions
McKinley	1977	26,100	45.0	0.0	31,900	55.0	0.0	58,000	0.0
	1980	30,550	47.2	1.9	34,200	52.8	(1.7)	64,750	2.5
	1985	34,050	47.3	1.7	37,950	52.7	(1.5)	72,000	2.8
	1990	39,000	48.4	2.3	41,600	51.6	(2.1)	80,600	3.5
Rio Arriba	1977	5,600	19.9	0.0	22,500	80.1	0.0	28,100	0.0
	1980	9,200	31.1	0.0	20,400	68.9	0.0	29,600	0.0
	1985	12,400	38.3	0.0	19,950	61.7	0.0	32,350	0.0
	1990	16,000	45.2	0.0	19,400	54.8	0.0	35,400	0.0
Sandoval	1977	0	0.0	0.0	24,400	100.0	0.0	24,400	0.0
	1980	0	0.0	0.0	26,950	100.0	0.0	26,950	0.2
	1985	0	0.0	0.0	32,800	100.0	0.0	32,800	0.6
	1990	0	0.0	0.0	40,250	100.0	0.0	40,250	0.4
San Juan	1977	39,900	58.1	0.0	28,800	41.9	0.0	68,700	0.0
	1980	45,800	61.7	1.1	28,450	38.3	(1.8)	74,250	2.4
	1985	53,500	65.5	1.0	28,150	34.5	(2.0)	81,650	2.5
	1990	60,200	66.6	1.1	30,150	33.4	(2.1)	90,350	3.3
Valencia	1977	18,900	37.9	0.0	31,000	62.1	0.0	49,900	0.0
	1980	24,350	44.0	0.5	31,000	56.0	(0.4)	55,350	0.7
	1985	28,650	42.9	0.5	38,200	57.1	(0.3)	66,850	1.0
	1990	33,200	41.3	0.7	47,200	58.7	(0.5)	80,400	0.8
Five Counties	1977	90,500	39.5	0.0	138,600	60.5	0.0	229,100	0.0
	1980	109,900	43.8	1.4	141,000	56.2	(1.1)	250,900	1.5
	1985	128,600	45.0	1.4	157,050	55.0	(1.1)	285,650	1.7
	1990	148,400	45.4	1.6	178,600	54.6	(1.3)	327,000	2.0

Source: Harbridge House, Inc., 1978, utilizing definitions of and information from the U.S. Department of Commerce, Bureau of the Census.

## DEMOGRAPHIC FEATURES

The proposed actions would add 6,350 persons, or 2.0 percent to the projected population of the five-county area by 1990. This gain would be relatively more significant to those portions of the five counties which comprise the ES Region, increasing the total number of inhabitants by 2.9 percent. Table 3-1 gives the projected population of the five-county area in 1980, 1985, and 1990 by county, with the percentage increase due to the proposed actions relative to projections of the future in the absence of those actions. Table 3-2 estimates the number of inhabitants of the ES Region for the same years. Both tables include columns showing the population growth rate with the proposed actions. Most of the impact will be felt in the first years of the projection, as may be seen in the tables. No impacts have been projected for Rio Arriba County due to absence of any incorporated or major unincorporated community which would accommodate immigrants.

The cumulative effect of the proposed actions would be to increase annual rates of growth in the population of the ES Region by more than 27 percent between 1980 and 1985, and by five percent between 1980 and 1990. This accelerated rate of increase in the number of inhabitants of northwestern New Mexico would magnify present trends, enlarging population densities increasing the relative size of urban populations and diminishing the magnitude of population in rural areas. As shown in Table 3-3, the most affected county would be McKinley, where 1990 population densities would increase by 3.5 percent to 14.8 inhabitants per square mile, compared to a projected 14.3 persons per square mile without the proposed actions. Existing cities, villages, and unincorporated areas would grow, with some now relatively small communities like Crownpoint becoming major population centers. The shifting balance between urban and rural populations is projected in Table 3-4.

Table 3-5 presents projected populations for incorporated cities and villages and major unincorporated communities for 1980, 1985, and 1990 with the proposed actions. The largest community in McKinley County would still be Gallup, which would experience an increase of 4.9 percent over projected levels of population in the absence of proposed actions. The high percentage increases anticipated for Crownpoint, Prewitt, and Thoreau would essentially be due to their initially small size. In Sandoval County, Cuba's population would grow by 13.3 percent over projected levels in the absence of development, reaching a maximum of 850 persons in the year 1990. Communities in San Juan County are also expected to register large gains in size between 1977 and 1990. Most of these new residents would not be a consequence of the proposed actions, but have been projected for the future without the proposals.

In Table 3-5, no impacts were projected for primarily Indian communities, like Shiprock, Zuni, or areas of the Jicarilla Apache Reservation. The additional population growth in McKinley, Sandoval, San Juan, and

TABLE 3-4

POPULATION DENSITIES, FIVE-COUNTY AREA, 1980-1990, WITH PROPOSED ACTIONS

<u>County</u>	<u>1980</u> <u>Population</u> <sup>a</sup> (in persons)	<u>1980</u> <u>Density</u> <u>Population</u> (in persons per square mile)	<u>Increase</u> <u>w/ Proposed</u> <u>Actions</u> (in %)	<u>1985</u> <u>Population</u> <sup>a</sup> (in persons)	<u>1985</u> <u>Density</u> <u>Population</u> (in persons per square mile)	<u>Increase</u> <u>w/Proposed</u> <u>Actions</u> (in %)	<u>1990</u> <u>Population</u> <sup>a</sup> (in persons)	<u>1990</u> <u>Density</u> <u>Population</u> (in persons per square mile)	<u>Increase</u> <u>w/ Proposed</u> <u>Actions</u> (in %)
McKinley	64,750	11.9	2.6	72,000	13.2	3.1	80,600	14.8	3.4
Rio Arriba	29,600	5.1	0.0	32,350	5.5	0.0	35,400	6.1	0.0
Sandoval	26,950	7.3	1.2	32,800	8.9	1.1	40,250	10.8	0.0
San Juan	74,250	13.5	3.1	81,650	14.8	2.1	90,350	16.4	3.1
Valencia	55,350	9.8	1.0	66,850	11.8	0.9	80,400	14.2	0.7
Five Counties	250,900	9.6	2.1	285,650	10.9	1.9	326,950	12.5	1.6

Source: <sup>a</sup>Harbridge House, Inc., estimates on the basis of population projections of the University of New Mexico, Bureau of Business and Economic Research.



Valencia Counties stemming from the proposed actions would further increase the English-speaking population of the ES Region and dilute the relative numbers of Hispanic and Indian inhabitants. This impact on the racial and ethnic composition of the ES Region is shown in Table 3-6. Thus, by the year 1990 with the proposed actions, the number of Anglo inhabitants of the five counties would be increased by 2.6 percent, to constitute 44.2 percent of all inhabitants of the ES Region, while persons speaking Spanish as their primary language would drop 2.0 percent to 23.9 percent, and residents speaking an Indian language would drop 1.9 percent to 31.2 percent.

Approximately 260 unauthorized occupants and 100 unauthorized structures have been identified as being on public lands within one mile of sites of proposed actions. On site, there was an estimated total of 250 legal residents and unauthorized occupants on private, Indian, state, and federal properties (U.S. Department of the Interior, Bureau of Land Management, 1977). Estimates of the extent of unauthorized occupancy of public lands are based on surveys conducted in 1974 by the U.S. Bureau of Land Management and by information received from mining companies active in the area, and are only approximate. The Navajo, who are a majority of the residents in the vicinity of the sites, live in extended families which are subject to continual fluctuations as relatives arrive and depart. Given the traditional life-styles the Navajo follow, many structures are only seasonally occupied, resulting in different figures with each survey attempt. Further, unauthorized occupants are reluctant to be identified due to the illegal nature of their tenure.

With the development of coal reserves and related actions, both legal residents and unauthorized occupants would be forced to move to other parts of the Eastern Navajo Agency, to the Navajo Indian Reservation itself, or into the urban areas of the region. The relocation of both legal residents and unauthorized occupants of lands to be developed with the proposed actions would impose personal hardship on an estimated 250-300 persons. However, property owners and all others would receive full compensation for the value of land taken and for the value of improvements. Furthermore, relocation would be negotiated in conformity with laws governing sale of property. The procedures to be used and the legal rights of unauthorized occupants are uncertain. Illegal occupancy of public lands is a problem which has existed for many years but past attempts to resolve it have not been successful. Without a special effort by government and industry (see Chapter 4), unauthorized occupants would face loss of homes and other structures, relocation to unknown areas, and consequent economic and psychological distress. Impacts without compensation or assistance would be the greater because many of the persons affected speak primarily Navajo and are not accustomed to negotiating with Anglo companies.

#### ECONOMIC CONDITIONS

By 1990 the proposed actions would have a cumulative impact of 6,735 jobs, an addition of 6.1 percent to employment in the five-county area over levels projected in the absence of the proposals. Total personal

TABLE 3-5

## NUMBER OF INHABITANTS OF MAJOR COMMUNITIES, ES REGION, 1977-1990, WITH PROPOSED ACTIONS

Community	1977 <sup>a</sup> Number of Inhabi- tants	1980 <sup>b</sup> Number of Inhabi- tants	Percent Increase w/ Proposed Actions	1985 <sup>b</sup> Number of Inhabi- tants	Percent Increase w/ Proposed Actions	1990 <sup>b</sup> Number of Inhabi- tants	Percent Increase w/ Proposed Actions
MCKINLEY COUNTY							
Crownpoint (U)	3,500	5,400	12.5	6,300	11.5	7,950	13.6
Gallup (C)	18,400	20,850	3.5	22,900	3.6	25,750	4.9
Prewitt (U)	400	600	9.1	750	7.1	950	11.8
Thoreau (U)	700	1,850	8.8	2,050	7.9	2,650	8.2
Zuni Pueblo (U)	4,200	4,300	0.0	4,850	0.0	5,300	0.0
SANDOVAL COUNTY							
Cuba (V)	550	700	16.6	750	15.4	850	13.3
SAN JUAN COUNTY							
Aztec (C)	4,650	6,100	5.2	7,000	5.3	8,650	6.1
Bloomfield (V)	2,200	2,850	7.5	3,200	8.5	3,800	8.6
Farmington (C)	29,750	33,900	3.2	36,950	3.6	40,800	4.5
Shiprock (U)	5,500	5,800	0.0	6,350	0.0	6,950	0.0
VALENCIA COUNTY							
Grants (C)	9,900	13,700	1.5	15,650	2.0	17,950	2.0
Milan (V)	3,000	4,300	2.4	5,050	2.0	6,050	2.5

Notes: (U), unincorporated.  
(C), incorporated as city.  
(V), incorporated as village.

Sources: <sup>a</sup> Harbridge House, Inc., estimates on the basis of New Mexico Employment Security Commission, New Mexico Annual Planning Report, Fiscal Year 1979, 1978, except for Crownpoint, Prewitt, and Thoreau (b) and Shiprock (c), as noted.

<sup>b</sup> Harbridge House, Inc., estimates on the basis of projections of University of New Mexico, Bureau of Business and Economic Research, and local governments.

<sup>c</sup> McKinley Area Council of Governments, Overall Economic Development Program, 1977.

<sup>d</sup> William F. Turney and Associates, U.S. Bureau of Reclamation-Navajo Tribal Utility Authority Water Study, 1976.

income would rise by an estimated 14.0 percent, or \$142.5 million, by 1990. Table 3-7 shows employment impacts for the years 1980, 1985 and 1990. Direct impacts from the proposed actions would equal nearly 3,360 jobs after thirteen years. This employment would occur in three sectors in which employment from proposed actions would be classified: mining, construction, and utilities. Indirect impacts would equal an additional 3,380 jobs, as a result of the so-called "multiplier effect." Hiring and spending by companies developing and operating mines and related facilities in northwestern New Mexico would inject money into the regional economy, which would be spent again by employees and vendors, making possible more employment and income. Indirect impacts would be experienced in all sectors.

Direct and indirect employment impacts of proposed actions would significantly increase the size of five major sectors in all counties with the exception of Rio Arriba. No impacts have been projected for Rio Arriba County because of the lack of an incorporated or major unincorporated community which could serve as a growth center. Table 3-8 gives the number of workers employed by sector in 1990. As the table indicates, the contract construction sector would be most affected, with the projected number of construction jobs rising by 17.9 percent. In San Juan County, where Public Service Company of New Mexico (PNM) would be building the New Mexico Generating Station in 1990, construction employment would increase by 32.3 percent. But elsewhere, the additional number of jobs would be an indirect consequence of proposed actions, principally in new home construction and building of community facilities. Employment in transportation, communications and utilities would also rise; the projected gain of 14.4 percent in the five-county area reflects both the PNM plant and the Star Lake Railroad.

With the proposed actions, jobs in the mining sector would be increased by 8.1 percent; while 20-30 jobs would be created indirectly, 1,125 would be created directly. The greatest relative gains would occur in McKinley County, where employment in coal mining would rise by 177.6 percent; the increase in coal mining jobs in San Juan County would be 120.3 percent. No direct or indirect impacts have been projected for metal mining or production of petroleum and natural gas. The former would still grow and the latter decline as indicated in Chapter 2. Despite the growth anticipated for employment in coal mining with proposed actions, metal mining -- principally the mining of uranium on private, Indian and state lands -- would account for 72.3 percent of all mining jobs. Because of the additional employment from proposed actions, the mining sector would increase in size relative to other sectors, from the 14.2 percent projected for 1990 without the proposals to 14.4 percent.

However, the largest sectors would remain the government, trade, and services sectors. Indirect impacts from the proposed actions would add to jobs in each by 1.8, 6.7 and 3.1 percent respectively. Agricultural employment is projected to grow marginally. However, the proposed

TABLE 3-6

PERCENTAGES OF TOTAL NUMBER OF INHABITANTS BY PRIMARY LANGUAGE SPOKEN, FIVE-COUNTY AREA, 1977 and 1990, WITH PROPOSED ACTIONS

County	Year	Speaking English	Percent Increase w/ Proposed Actions	Speaking Spanish	Percent Increase w/ Proposed Actions	Speaking Indian	Percent Increase w/ Proposed Actions	Other	Percent Increase w/ Proposed Actions	Total
McKinley	1977	30.8	0.0	9.7	0.0	58.8	0.0	.7	0.0	100.0
	1990	36.5	6.1	8.9	(3.3)	53.9	(3.4)	.7	0.0	100.0
Rio Arriba	1977	15.7	0.0	68.9	0.0	15.1	0.0	.3	0.0	100.0
	1990	15.2	0.0	69.3	0.0	15.2	0.0	.3	0.0	100.0
Sandoval	1977	28.5	0.0	31.8	0.0	39.0	0.0	.7	0.0	100.0
	1990	34.2	0.9	29.2	(0.3)	35.9	(0.6)	.7	0.0	100.0
San Juan	1977	58.7	0.0	6.5	0.0	34.0	0.0	.8	0.0	100.0
	1990	61.7	2.0	6.0	(3.2)	31.5	(3.1)	.8	0.0	100.0
Valencia	1977	45.3	0.0	39.8	0.0	13.9	0.0	1.0	0.0	100.0
	1990	50.1	0.8	36.4	(0.5)	12.7	(0.8)	.9	0.0	100.0
Five Counties	1977	39.9	0.0	25.8	0.0	33.4	0.0	.9	0.0	100.0
	1990	44.2	2.6	23.9	(2.0)	31.2	(1.9)	.7	0.0	100.0

Source: Harbridge House, Inc., projections based on figures from U.S. Department of Commerce, Bureau of the Census, Census of Population, 1970, Characteristics of the Population, New Mexico, 1971.

actions would have adverse impacts on ranching at project sites and in their immediate vicinity. Sites presently are estimated to have a capacity of approximately 2,400 animal unit months (AUM's). Development and operation of mines and related facilities would therefore force a reduction in present herds of 210 to 1,040 animals, or their relocation to new grazing areas. In the territory of the Eastern Navajo Agency, 97.6 percent of livestock operators were recently estimated to possess less than 50 animals; adverse impacts on agriculture would be experienced primarily by subsistence and part-time ranchers. Impacts would thus further weaken the traditional, pastoral life-style of native inhabitants of the area.

The proposed actions would increase total personal income in the ES Region by 15.4 percent in 1980, 12.3 percent in 1985, and 13.6 percent in 1990. Table 3-9 details increases by county. The greatest relative gains would occur in San Juan County, reflecting that county's larger share of population and employment impacts. Per capita incomes would also rise, but relative increases over projected levels in the absence of proposed actions would be small, as a result of worker immigration and population growth. The greatest percentage rise would be 1.2 percent in San Juan County. Projected per capita incomes for the five-county area with the proposed actions are shown in Table 3-10. Direct employment and impacts of proposed actions would be concentrated in high-wage sectors of the economy -- the construction, mining, transportation, communications and utilities sectors. In 1977, average wages of \$26,650 in the mining of bituminous coal were the highest of any of 42 sectors in northwestern New Mexico. Pay scales were also high in non-residential construction (\$16,980), railroad transportation (\$21,375), and electric utilities (\$21,135). These wages compare to lows in agriculture (\$4,895) and services (\$6,290) (New Mexico Employment Security Commission, 1977b).

A consequence of these income disparities would be a likely increase in labor turnover, such as has been observed in other areas in which large-scale resource development has occurred (Gilmore and Duff, 1974). Employees in established sectors with low pay scales would be expected to shift to higher-paying jobs in mining and related industries. Impacts on agriculture in the vicinity of mines and related facilities would be severe, as agricultural workers and subsistence ranchers took higher paying jobs. In all sectors levels of productivity would drop as a result of turnover, and costs of production would rise. Difficulties in holding labor would force wages in most sectors up, and contribute to increases in local costs of living. Thus absolute incomes would rise, but effects on relative levels would be uncertain.

The impacts of proposed actions on unemployment rates and per capita income among particular racial and ethnic groups are difficult to predict, for the reasons noted in Chapter 2. Northwestern New Mexico is characterized by structural economic problems due to the three distinct

TABLE 3-7

NUMBER OF WORKERS EMPLOYED, FIVE-COUNTY AREA, WITH PROPOSED ACTION, 1977-1990

<u>County</u>	<u>1977</u> <u>Employment</u>	<u>1980</u> <u>Employment</u>	<u>Percent Increase</u> <u>with</u> <u>Proposed Actions</u>	<u>1985</u> <u>Employment</u>	<u>Percent Increase</u> <u>with</u> <u>Proposed Actions</u>	<u>1990</u> <u>Employment</u>	<u>Percent Increase</u> <u>with</u> <u>Proposed Actions</u>
McKinley	19,236	22,570	7.0	27,160	7.6	32,835	7.5
Rio Arriba	6,286	6,620	0.0	7,220	0.0	7,880	0.0
Sandoval	5,082	6,080	0.7	8,150	0.5	10,801	0.6
San Juan	27,411	30,760	6.3	33,835	6.8	38,725	11.6
Valencia	11,491	14,220	1.3	19,770	1.0	27,320	1.2
Five-County Area	69,506	80,250	3.7	96,135	3.8	117,570	6.1

Source: Harbridge House, Inc., estimates on the basis of 1970-1977 trends in data supplied by New Mexico Employment Security Commission, and 1970-75 trends in data from U.S. Department of Commerce, Bureau of Economic Analysis, and results of input-output model programmed by Larry Adcock & Associates, as outlined in Technical Appendix.

TABLE 3-8

NUMBER OF WORKERS EMPLOYED BY SECTOR, FIVE-COUNTY AREA, WITH PROPOSED ACTIONS, 1990

<u>Sector</u>	<u>McKinley County</u>		<u>Rio Arriba County</u>		<u>Sandoval County</u>		<u>San Juan County</u>		<u>Valencia County</u>		<u>Five-County Area</u>	
	<u>Number<sup>a</sup></u> <u>of</u> <u>Workers</u>	<u>Percent</u> <u>Increase</u> <u>with</u> <u>Proposed</u> <u>Actions</u>	<u>Number<sup>a</sup></u> <u>of</u> <u>Workers</u>	<u>Percent</u> <u>Increase</u> <u>with</u> <u>Proposed</u> <u>Actions</u>	<u>Number<sup>a</sup></u> <u>of</u> <u>Workers</u>	<u>Percent</u> <u>Increase</u> <u>with</u> <u>Proposed</u> <u>Actions</u>	<u>Number<sup>a</sup></u> <u>of</u> <u>Workers</u>	<u>Percent</u> <u>Increase</u> <u>with</u> <u>Proposed</u> <u>Actions</u>	<u>Number<sup>a</sup></u> <u>of</u> <u>Workers</u>	<u>Percent</u> <u>Increase</u> <u>with</u> <u>Proposed</u> <u>Actions</u>	<u>Number<sup>a</sup></u> <u>of</u> <u>Workers</u>	<u>Percent</u> <u>Increase</u> <u>with</u> <u>Proposed</u> <u>Actions</u>
Agriculture	160	0.0	400	0.0 <sup>b</sup>	565	0.0	1,385	0.7	635	0.0	3,145	0.3
Mining	6,840	14.8	40	0.0	370	0.0	2,635	17.6	7,085	0.0	16,970	8.1
Metal	5,220	0.0	—	—	—	—	270	0.0	6,780	0.0	12,270	0.0
Petroleum	20	0.0	35	0.0	20	0.0	1,560	0.0	80	0.0	1,715	0.0
Coal	1,360	177.6	—	—	300	0.0	705	120.3	—	—	2,365	113.1
Construction	1,175	6.8	200	0.0	1,515	0.3	6,055	32.3	1,450	1.4	10,395	17.9
Manufacturing	1,520	6.3	420	0.0	2,200	0.0	1,795	5.6	815	2.5	6,750	3.1
Transportation, Communications & Utilities	1,385	11.4	230	0.0	635	0.8	4,665	22.4	1,365	2.6	8,280	14.4
Trade	5,775	10.8	1,065	0.0	1,030	3.0	7,240	9.2	6,380	2.2	21,490	6.7
Finance, Insurance & Real Estate	575	13.9	310	0.0	430	1.2	1,040	7.8	925	1.6	3,280	5.3
Services	5,795	4.6	1,515	0.0	2,240	0.4	6,940	4.1	3,385	1.8	19,875	3.1
Government	9,600	4.4	3,700	0.0	1,825	0.6	6,970	3.3	5,280	1.0	27,375	1.8
Total	32,825	7.5	7,880	0.0	10,810	0.6	38,725	11.6	27,320	1.2	117,560	6.1

Notes: <sup>a</sup> All figures rounded to the nearest 5, with some sectors experiencing slight impact (1 or 2 jobs in a county) showing no impact.

<sup>b</sup> No impacts assumed for Rio Arriba County, as explained in text.

Source: Harbridge House, Inc., estimates on basis of results of input-output model programmed by Larry Adcock & Associates, as outlined in Technical Appendix.



cultures in the region. Hispanos and Indians both are characterized by difficulties in obtaining jobs, especially in better income, and more skilled categories. In rural and reservation areas, a traditional pastoral economy persists, largely independent of the modern, industrial economy of urban areas built on mining. Governments have attempted to address resulting problems of unemployment and poverty by special assistance programs. The Navajo Nation and the Bureau of Indian Affairs (BIA), for example, have stressed the importance of training Indians for mining jobs in anticipation of employment increases in the mining sector. At present there is one project in which Navajos receive "on-the-job" training from mining companies under the supervision of tribal authorities and during this training period, Indians receive part of their salary from Comprehensive Education and Training Act (CETA) federal funds. When this project was directly under the administration of the BIA, approximately 150 Navajos were trained in both 1974 and 1975 (Bureau of Indian Affairs, 1977).

In addition, a vocational education and skills center which is being built in Crownpoint by the Navajo Nation is projected for completion in 1979. With this center the Navajo could receive instruction in specific mining skills and the tribe would arrange placements with companies in the area (Bureau of Indian Affairs, 1977b). Both approaches to the training of Indians represent an extension of previous policies to insure that the Navajo benefit from developments occurring in their midst. The success of these programs depends on the continued cooperation of mining corporations and the adequacy of instruction offered; an evaluation of either cannot be made at this time. But it seems likely that, given the tribal intent to press the issue of employment opportunities for members and the fact that most mines in the ES Region would involve some Indian lands and allotments, the Navajo and other Indians would share in the employment and earnings generated by the proposed actions.

To the degree that Indians overcome a present lack of skills and a perceived attitude of prejudice, per capita incomes among Indians would rise toward regional and county levels projected in Table 3-10. A marked increase in Indian incomes would have major impacts on the traditional pastoral economy which has survived in rural and reservation areas of the ES Region. Already, the improvement and construction of roads into these parts of the region is ending the isolation of inhabitants, and raising more opportunities for Indians to take jobs, to shop, and to obtain services in the urban communities like Farmington, Gallup, and Grants. Further roadbuilding due to the proposed actions would encourage such travel. More important, planned developments on federal lands in eastern McKinley, western Sandoval, and southern San Juan Counties would lead to population increases and employment openings in the territory of the Eastern Navajo Agency. Growth would thus create urban centers in these once exclusively rural districts. In this new context, the Indians of the Eastern Navajo Agency would be tempted to abandon, at least in part, the pastoral life-style of past generations in response to chances for



TABLE 3-9

VALUE OF TOTAL PERSONAL INCOME, FIVE-COUNTY AREA, WITH PROPOSED ACTIONS, 1977-1990  
(in thousands of 1975 dollars)

<u>County</u>	<u>1977</u> <u>Income</u>	<u>1980</u> <u>Income</u>	<u>Percent Increase</u> <u>With Proposed</u> <u>Actions</u>	<u>1985</u> <u>Income</u>	<u>Percent Increase</u> <u>With Proposed</u> <u>Actions</u>	<u>1990</u> <u>Income</u>	<u>Percent Increase</u> <u>With Proposed</u> <u>Actions</u>
McKinley	169,451	233,291	17.2	295,430	11.8	389,744	14.3
Rio Arriba	49,701	57,535	0.0	79,216	0.0	104,065	0.0
Sandoval	31,833	38,656	2.6	50,927	2.0	66,174	2.1
San Juan	224,626	311,031	23.8	363,958	20.1	450,636	23.3
Valencia	88,137	108,285	4.8	139,696	3.8	182,510	4.1
Five-County Area	563,748	748,798	15.4	929,227	12.3	1,193,129	13.6

Source: Harbridge House, Inc., estimates on the basis of 1970-1975 trends in data supplied by U.S. Department of Commerce, Bureau of Economic Analysis, and results of input-output model programmed by Larry Adcock & Associates, as outlined in Technical Appendix.

TABLE 3-10

PER CAPITA INCOMES, FIVE-COUNTY AREA, WITH PROPOSED ACTIONS, 1977-1990

<u>County</u>	<u>1977<sup>a,b</sup></u> <u>Per Capita</u> <u>Income</u>	<u>1980<sup>a,b</sup></u> <u>Per Capita</u> <u>Income</u>	<u>Percent Increase</u> <u>With Proposed</u> <u>Actions</u>	<u>1985<sup>a,b</sup></u> <u>Per Capita</u> <u>Income</u>	<u>Percent Increase</u> <u>With Proposed</u> <u>Actions</u>	<u>1990<sup>a,b</sup></u> <u>Per Capita</u> <u>Income</u>	<u>Percent Increase</u> <u>With Proposed</u> <u>Actions</u>
McKinley	4,362	4,801	1.0	5,525	1.1	6,399	1.1
Rio Arriba	3,743	3,995	0.0	4,675	0.0	5,270	0.0
Sandoval	3,481	3,754	1.0	4,187	1.0	4,671	1.0
San Juan	5,180	5,761	1.2	6,744	1.2	7,895	1.2
Valencia	4,620	5,184	1.0	6,159	1.0	7,317	1.0
Five-County Area	4,494	4,962	1.1	5,772	1.2	6,703	1.2

Note: <sup>a</sup>Figures in constant 1977 dollars.

Source: <sup>b</sup>Based on 1970-1975 trends in unpublished computer printouts of U.S. Department of Commerce, Bureau of the Census, and results of input-output model programmed by Larry Adcock & Associates.

new employment and increased earnings. Insofar as these Navajo did adopt a different way of living, there would be economic effects in addition to the impacts on social and cultural characteristics discussed later. Casualties of this change would include trading post owners, whose profitable credit and loan activities would no longer be as necessary to an increasingly affluent population. Of course, the rising incomes of their customers would present other business opportunities to these store operators, as two who were interviewed in the Harbridge House survey of key informants pointed out.

Ultimately, developments in the area, by enlarging communities and improving access, would help to increase business competition by adding to the number of sources of goods and services in the region, and by improving customer access to different vendor locations. But because of the rapid rate of projected growth, short-term, temporary shortages of some commodities would be experienced as demand increases. Increased labor turnover as discussed above, would also lead to decline in productivity and higher prices. Costs of living would be increased in both these ways, with the most serious consequences for persons living on fixed incomes who would not be benefiting directly or indirectly from employment and earnings growth. Persons with low incomes would also be adversely affected. Hispanos and Indians who are proportionately more common in lower income brackets, insofar as they did not obtain employment as a result of the proposed actions, would be adversely affected. Cost of living increases would be greatest during initial years of investment and immigration. Thereafter, as supply of goods and services race to meet demand, inflation would diminish. Moreover, the proposed actions would add to already rising demand; hence not all cost hikes could be attributed to planned developments; projected population increases without the coal-related actions would have similar effects.

In general, the proposed actions would not alter the economic structure and relationships of northwestern New Mexico's modern, urban economy. Mining has already developed as the economic base of the ES Region. The effects of the planned developments would be to add further to the importance of mining. In addition, the direct and indirect impacts would benefit all non-base, or secondary industries as the tables show. However, mining would provide the ES Region's principal export, either as minerals or as coal-fired electricity. When the mineral reserves are depleted to the point that extraction is no longer economically justified, the regional economy would suffer a severe shock as it attempted to locate and adjust to a new base industry. If, before resources are fully developed, market prices for steam coal or uranium were to fall, the effect would be the same. The proposed actions would further tie the economy of northwestern New Mexico to mining. However, present and projected expansion of uranium mining in the region is far greater than the expansion of coal mining being proposed, and regional dependency on minerals resource development is projected in the absence of the proposed actions.

## COMMUNITY INFRASTRUCTURE

Impacts on community infrastructure would result indirectly from proposed actions due to projected increases in population. In addition, direct impacts from operation of mines and related facilities would occur on roads leading to and from sites, in respect to tax revenues from mining companies, and as a result of accidents on the jobs which lead to use of health care facilities. These impacts are explored below. In general, increased funding, hiring, and new construction would be required to accommodate projected needs. However, the magnitude of these needs would be relatively small compared to projections of what will be required in the absence of proposed actions. Throughout this assessment, present standards of adequacy have been utilized. Should concepts of sufficiency change, analysis would necessarily be revised.

### Governmental Authorities

With additional population due to proposed actions, increased pressure would be placed on local governments to provide basic services to accommodate growth. Need for both urban and rural planning and land use controls would become greater as existing communities expand, and new communities develop to service coal mining sites. Especially difficult administrative problems would be likely to exist in unincorporated areas adjacent to existing urban communities and in places where there is little land for development. Zoning and land use regulations would be required at an earlier point in time. Certain entities like county planning departments would be directly involved in degree and location of new development.

Proposed developments would generate revenues (various taxes paid on coal produced, power plant facilities, and property and other taxes paid by new residents) and costs (associated with higher levels of public services to be provided). The costs to local governments stemming from planned actions would greatly exceed additional revenues in the initial years of investment and immigration. Previous estimates of the necessary increases in spending by counties, municipalities, school and special districts to accommodate growth in northwestern New Mexico and elsewhere have approximated 7.2 million per thousand new residents for a 13-year period, 1977-1990 (Environmental Protection Agency, 1977; THX Associates, Inc., 1974). This money would include \$3.6 million for one-time capital spending to build or expand facilities per thousand new inhabitants and \$600,000 per thousand annually for recurrent expenses related to operation and maintenance of facilities.

The population increases associated with the proposed actions would consist of 3,800 persons by 1980 and a cumulative total of 6,350 additional inhabitants by 1990. Therefore, by 1980 local governments in

the ES Region would require \$17.1 million in new revenues to accommodate demands on facilities and services and by 1990 local governments would need approximately \$45.7 million. A comparison of these increased costs with additional taxes generated by developments of federal lands indicates that local governments, unlike the State of New Mexico, would be confronted with a severe lack of available financing.

Projected state tax revenues due directly to the proposed actions are expected to equal \$297,000 a year in 1980 and \$3.8 million in 1990, the burden of severance and conservation taxes being estimated at 1.1 percent with a value of \$13.50 per ton. Severance taxes on the value of the coal itself would be the principal form of taxation by the state. Severance taxes are presently paid to the state at the rate of 38 cents per ton. Total payments in 1990 would accrue on production of two million tons and in 1990 on 24 million tons. Revenues to the state would go into three funds, one of which, the severance tax bonding fund, can be used to issue bonds for capital outlays for any project specified by the state legislature (New Mexico State Planning Office, 1976). This revenue could be used to fund capital improvements needed at the local level. In addition, other portions of severance tax revenues would be returned to county and municipal authorities as state grants; however, the amount of this assistance would be uncertain and cannot be considered as committed (see Chapter IV) (New Mexico Energy Resources Board, 1977).

For local governments, the proposed actions would also result in increased taxes. Property taxes would be paid on the removal of coal with the value of minerals extracted less cost of production being the basis of taxation. Like real property, coal is assessed at one-third market value. In 1976, 75 percent of the market value of coal was assessed. When the legal assessment ratio of one-third is expired, coal produced would be effectively assessed at 25 percent of market value. A market value of \$13.50 per ton (constant 1976 dollars) for coal has been used to project revenues. This translates to a valuation of \$3.375 per ton. Local governments would therefore gain an estimated \$1.1 million annually by 1980 and 12.0 million by 1990, at a tax rate of \$40 per thousand.

Property tax yields from residential sources would also grow as new housing was developed to accommodate population increases. The cost of new housing in northwestern New Mexico has been estimated at about \$20,000 for a mobile home and \$45,000 for a permanent dwelling unit. At the legal assessment ratio of 33.3 percent, the taxable value of a mobile home would be about \$6,600 and a permanent house about \$14,850. Using a weighted average of these two figures which reflects a projected 80 percent preponderance of mobile homes, \$8,250, and a regional estimate of \$40 tax levy per \$1,000 of valuation, the tax payment per property would be about \$330. This relatively low figure underscores the limited revenue-generating capability of property taxes. Nevertheless, with 1,865 additional housing units as a result of the proposed actions, local revenues would rise by 368,300 a year in 1980 and \$615,450 by 1990.

In addition to property taxes, sales taxes would be generated by anticipated immigration and related growth in retail and other business sectors. Gross receipts income, which accrues both to the state and the municipalities would rise along with increases in local business, especially retail operations, roughly in accordance with expected earnings increases projected in Table 3-4. Sales taxes would make a minor contribution to local funds. Other minor taxes which would probably also increase in yield would include licenses and local fees and fines, cigarette taxes, and franchise taxes.

The cumulative projected increase in local tax revenues for all governments in the ES Region due to the proposed actions would equal approximately \$2.3 million by 1980 and \$82.8 million by 1990. These figures assume that counties, municipalities, school, and special districts increase property and sales tax rates to maximum levels permitted by New Mexico law. By 1990, these increases in revenue would be insufficient to meet the projected fiscal needs of \$45.7 million among all local governments. However, spending would be most needed in the late 1970's and early 1980's, when revenues would not have accumulated sufficiently. During the years in which immigration, and consequently needs for New services and facilities would be greatest, there would be a serious shortfall in local government income. In 1980, increased revenues of \$2.3 million would compare to increased costs of \$17.1 million. State severance taxes would be a possible source of assistance, but there is no guaranteed mechanism to supply funds under the new Mexico Severance Tax Act of 1977 (New Mexico House of Representatives, 1977). Hence, communities in northwestern New Mexico would be confronted with serious financial difficulties. They would be forced to borrow the needed funds commercially to the extent bonding limits would allow, or to seek special federal and state assistance. The latter sources of funding are discussed further in Chapter 4.

#### Transportation Networks

Population increases due to the proposed actions would result in the addition of 6,985 motor vehicles to highways in the ES Region by 1990. These cars and trucks would represent a 4.3 percent increase in the number of vehicles utilizing roads. This increase would affect traffic throughout northwestern New Mexico marginally. However, given the poor condition of the highways described in Table 2-14, additional traffic might in a few instances significantly reduce driving times or adversely affect driving safety. Relatively greater impacts on transportation networks would result directly from proposed actions. In the short term, proposed actions would produce temporary increases in average daily traffic counts due to trucks and cars traveling to mines at which facilities would be developed or constructed. In the long term, truck traffic and commuter travel would be permanent effects of operation of facilities. Coal mining would require trucks hauling coal to processing



plants and rail shipping yards; Western Coal Company might truck coal from its Bisti mine to the San Juan Generating Station in some years during the 1980's. Mine workers and employees of the power plant and the railroad would commute to what are now isolated locations.

Table 3-11 suggests the magnitude of direct impacts on major highways which would provide access to sites. As the table suggests, while primary arteries like U.S. Routes 550 and 666, and N.M. Route 44 would experience large increases in traffic as a result of proposed actions, the greatest roadway impacts would occur on highways in the territory of the Eastern Agency, such as Navajo Route 9 (see Figure 2-4). A major problem expected from additional traffic on these roads is an increase in the number of accidents involving livestock. In most of the ES Region generally, and specifically in the vicinity of many of the proposed sites, range lands are not fenced, permitting collisions with stock animals which have wandered onto roadways. Projected increases in commuter and truck traffic on these rural roadways would require that highways be fenced off to eliminate this hazard.

A direct impact of the proposed actions on transportation systems in the ES Region would result from the construction and operation of the Star Lake Railroad. The planned rail line would double the miles of track in northwestern New Mexico. While the railroad would exist to service coal mines and related facilities in eastern McKinley County, western Sandoval County, and southern San Juan County, it would represent a significant addition to community infrastructure, one which might eventually carry produce from the Navajo Indian Irrigation project or link Farmington to Albuquerque by rail. Other than this line, much of the present and projected upgrading of transport networks in the ES Region (airports, rail lines, etc) will result from mining of coal and uranium not on federal lands.

#### Housing Units

Population increases associated with the proposed action would require an additional 1,865 housing units in the ES Region by 1990, an increase of 2.9 percent over projections without the proposal. Table 3-12 outlines housing needs by area for the years 1980, 1985 and 1990. Recent trends in the ES Region suggest that 80 percent of all new homes would be mobile units. Given the housing needs described in Table 3-12, a projected total of 1,492 mobile homes would be added to the regional housing stock as a result of proposed actions. This preponderance of mobile units in the total number of dwellings reflects the problems of high costs and inadequate financing discussed in Chapter 2. These problems would be especially severe for immigrants, whose accrued equity in a home elsewhere might not be sufficient to purchase a similar dwelling in northwestern New Mexico, due to high costs, and whose recent arrival in the ES Region might prevent them from establishing a line of credit with local banks.

TABLE 3-11

## MAJOR HIGHWAYS USE AND CONDITION, ES REGION, 1990, WITH PROPOSED ACTIONS

Route Number	Length in Miles	County	ADT w/ <sup>a</sup> Proposed Actions	Percent Increase from 1977 ADT <sup>b</sup>	Improvements Needed
U.S. 550	57.2	San Juan	8-12	30	Presently under construction to four-lane; state primary standards will require upgrading to remedy deficiencies in foundation and safety as a result of additional traffic generated by coal development. Rebuilding would be required at an accelerated rate.
U.S. 666	86.4	McKinley San Juan	11-14	35	Coal production would force acceleration of upgrading plans. Rebuilding may be necessary between Sheep Springs and U.S. 550 Intersection, as opposed to proposed overlay.
N.M. 371	78.2 (prop)	McKinley San Juan	3-6	100	A major access to coal leases (i.e., Bisti) and Public Service Co. of New Mexico Power Plant. Development requires acceleration of existing construction plans and additional upgrading to at least a two-way highway paved to state secondary standards. Existing portions near Farmington, presently rated deficient for safety reasons, and may require rebuilding. Highway may be temporarily used to truck coal to San Juan Power Plant from Bisti.
N.M. 44	160.2	San Juan Rio Arriba Sandoval	3-8	80	Major link from northwestern New Mexico, to Albuquerque. Much of the materials shipped in would use this route. Over 80 percent presently deficient, surface would require additional overlay.
N.M. 57/ 197	39.7	San Juan	1-3	100-300	Major commuter access between N.M. 44 and proposed N.M. 371, directly into coal lease sites. Twenty-six miles require bituminous paving to state secondary standards. N.M. 57 is main connecting link between coal areas and community of Thoreau.
Navajo Route 9	60.0	McKinley Sandoval	203	200-300	This road would serve as a primary access to coal leases in McKinley County. Deterioration from commuting traffic and transport of equipment will accelerate need for an asphalt overlay.
Navajo Route 46	20.5	Rio Arriba McKinley	1-3	100-300	Presently a lightly graded road requiring grading, drainage, and paving to accommodate hauling of materials and supplies and workers to the Star Lake area. Connecting link with N.M. 44.
Navajo Routes 47/47(A)/ 47(B)	35.6	Rio Arriba McKinley Sandoval	1-3	100-300	Presently dirt roads, proposed grading. Drainage and paving would facilitate coal production near Pueblo Pintado and Star Lake.

Notes: <sup>a</sup>ADT is average daily traffic.

<sup>b</sup>Increases have been figured from 1977 ADT given poor condition of many roads.

Sources: New Mexico State Department of Highways, "Highway Needs for Energy Resource Development," 1977. Navajo Area Road Office (Gallup, New Mexico), 1977.



### Educational Systems

As a result of the immigration associated with the proposed actions, the school-age population of the ES Region is projected to be 56,120 in 1990, an increase of 1,580 children or 2.9 percent over the projected population in the absence of the proposed actions. This growth in the school-age population would be expected to result in a comparable growth in public school enrollments, and would create a need for an additional 77 teachers and 28 support staff members. Figures for each school system are shown in Table 3-13.

### Health Care Systems

A shortage of trained medical personnel and accredited facilities exists within the assessment region generally. With expansion of coal mining in the region, special emphasis would need to be placed on medical care availability at mining sites, as well as emergency transportation to full-care facilities. An increase in black lung and other emphysematous conditions related to coal mining can be expected, requiring diagnostic equipment such as vital capacity measurement devices and blood gas analyzers. Table 3-14 projects impacts of the proposed actions on the number of health care personnel needed in the ES Region in order to maintain adequate health care services through 1990. An average additional requirement of 2.4-3.2 percent across all medical service personnel and facility categories defines the extent of coal development's impacts in this area. With the proposed actions, all areas would require increases in all categories of health care delivery systems. In addition, some special services would be necessary. Mental health personnel and appropriate mental health facilities would be needed; at present both are in short supply in the ES Region. Future needs would stem in part from social and cultural impacts discussed below. Emergency transport equipment staffed with trained paramedics would be required by 1980 with the ability to service the large number of isolated mine sites. Proposed actions would result in an increase in the number of mining accidents in the region. Using present averages of accidents per ton of coal mined there would be an estimated 1,625 non-fatal mine injuries and 18 fatalities by 1990 (U.S. Department of Interior, Mining Enforcement and Safety Administration, 1978).

### Public Safety and Police Protection

In general, police protection ratios in the ES Region approximate or exceed the national average of 1.8 sworn officers per 1,000 population. However, protection ratios applied to County Sheriff's Departments and Reservation law enforcement agencies may be misleading because of the

TABLE 3-12

HOUSING NEEDS, ES REGION, 1977-1990, WITH PROPOSED ACTIONS

Area	1980 Population <sup>b</sup>	Needed Housing Units <sup>a</sup>	Percent Increase w/ Proposed Actions	1985 Population <sup>b</sup>	Needed Housing Units <sup>a</sup>	Percent Increase w/ Proposed Actions	1990 Population <sup>b</sup>	Needed Housing Units <sup>a</sup>	Percent Increase w/ Proposed Actions
McKinley County	64,750	16,190	2.6	72,000	18,950	2.8	80,600	22,390	3.5
Rio Arriba County- Coyote & Jicarilla CCD's	4,900	1,290	0.0	5,300	1,470	0.0	5,700	1,675	0.0
Sandoval County- Cuba CCD	4,300	1,130	0.9	5,450	1,515	1.0	6,250	1,840	2.5
San Juan County- Valencia County- Fence Lake, Grants & Laguna CCD's	74,250	20,070	2.4	81,650	23,330	2.5	90,350	27,380	3.3
	30,750	8,540	1.3	35,650	10,485	0.8	41,600	13,000	1.6
ES Region	178,950	47,220	2.2	200,050	55,750	2.2	224,500	66,285	2.9

Note: <sup>a</sup>Housing units calculated on estimated average household size, from projections of U.S. Department of Commerce, Bureau of the Census.

Source: <sup>b</sup>Harbridge House, Inc., estimates on the basis of figures and projections of University of New Mexico, Bureau of Business and Economic Research.

extensive and oftentimes inaccessible terrain they must patrol. Table 3-15 indicates additional sworn police officers required over the projection period to maintain recommended levels of police protection, due to the proposed actions. The greatest increases would be required for county, state, and tribal officers in the region to patrol roads and unincorporated areas.

### Fire Protection

Fire protection facilities in the assessment region are generally adequate at present to meet the needs of the major population centers. Some upgrading and expansion of systems would be required to meet the needs of added population due to the proposed actions. These needs are outlined in Table 3-15. In a relative sense, the greatest need for fire protection would exist in rural areas which are now not served by any fire department, but which would experience development as a result of proposed actions.

### Water Supply and Wastewater Treatment

With the proposed actions, many of the local public service programs would either approach or exceed capacity by 1985. However, public service programs would experience strains more as a result of ongoing population pressures than from growth due to planned developments on federal lands. Impacts on water requirements are detailed in Table 3-16. Sewer systems in the ES Region are generally inadequate as a result of recent population pressures. Most of the municipal systems would either exceed or reach the limit of their capacities by 1985. The original systems, first constructed for small centralized communities, were not designed to meet the population and industrial growth brought about by energy-related development.

All municipal sewerage treatment and collection systems in San Juan County would require some form of upgrading by 1985 in order to adequately service their respective populations in compliance with applicable state and federal standards. The Farmington system has sufficient excess capacity to meet the demands of forecasted population growth with the proposed actions. The facility at present, however, does not comply with Environmental Protection Agency standards of secondary treatment and upgrading is required. Further, sewer lines in the city are presently inadequate to provide service to the existing population. Impacts of added people in the area would require extensive planning and installation of lines to city fringes as development occurs. Proposed programs costing approximately \$5.5 million would be insufficient to handle growth due to coal mining, and a doubling of these programs would be required by 1990 to meet demand. The Aztec sewerage system, currently operating at capacity, would require an expansion of 75 percent by 1990.

TABLE 3-13

PUBLIC EDUCATIONAL SYSTEMS REQUIREMENTS, ES REGION, 1990, WITH PROPOSED ACTIONS

<u>School District</u>	<u>1990 School Age Population<sup>a</sup></u>	<u>Teachers<sup>b</sup> Number Needed by 1990</u>	<u>Percent Increase With Proposed Actions</u>	<u>Support Staff<sup>b</sup> Number Needed by 1990</u>	<u>Percent Increase With Proposed Actions</u>
MCKINLEY COUNTY					
Gallup-McKinley School District	20,150	960	3.6	453	3.4
RIO ARRIBA COUNTY					
Jemez Mountain School District	1,425	68	0.0	32	0.0
SANDOVAL COUNTY					
Cuba Independent School District	1,560	74	1.4	35	2.9
SAN JUAN COUNTY					
Aztec Public School District	2,870	137	3.8	65	4.8
Bloomfield Municipal School District	3,250	155	3.3	73	4.3
Central Consolidated School District	6,910	329	3.5	155	3.3
Farmington Public School District	9,555	455	3.4	215	3.4
VALENCIA COUNTY					
Grants Public School District	10,400	495	1.4	234	1.7
ES REGION	56,120	2,673	3.0	1,262	2.3

Notes: <sup>a</sup>Ratio applied at 25 percent of projected population, reduced to reflect smaller family sizes from 30 percent recommended by Environmental Protection Agency, Energy From the West, 1977.

<sup>b</sup>Number needed and percent increase figures reflect accepted standards given in Table 2-17.

Source: Harbridge House, Inc., estimates on the basis of standards of New Mexico Department of Education and National Education Association.

to meet demand. The Bloomfield system is currently operating far in excess of existing capacity and services only 69 percent of the residential population. In order to adequately service existing population and to meet the demands of population growth through 1980, given the proposed actions, the Bloomfield system should triple its existing capacity.

#### SOCIAL AND CULTURAL CHARACTERISTICS

Demographic, economic, and infrastructural indicators of quality of life are common statistics; projections from this statistical base indicate impacts from proposed actions. Implications for the values, beliefs and life-styles which influence subjective quality of life are more difficult to project. Social and cultural impact are, however, no less real. There are two methods by which sociocultural impacts of resource development can be assessed. First, current trends and past experiences of the same or other communities can be used to extrapolate into the future. The proposed actions would chiefly involve extraction of minerals from public lands; communities located near sites could be expected to exhibit many of the same characteristics as other towns in the western United States in which large-scale mining activity has created sudden "booms."

The social and mental problems produced by rapid growth have come to be labeled the "Gillette Syndrome," named for one community in Wyoming. Attempted suicide, divorce, truancy, crime, child beating and alcoholism have all been observed to rise dramatically in boom-town situations. In Gillette, severe depression was so widespread, that suicide attempts increased to a rate of one per 250 persons. For similar reasons, divorces multiplied and pupils played truant. In such an environment, the first issue of life in a boom-town becomes, as one study concluded, simply human survival at a level above mere existence (Kohrs, 1974; Gilmore and Duff, 1975).

The second method is to rely upon the perceptions of area residents about the proposed developments and their expectations of the impacts upon themselves and their communities. While these perceptions and expectations may not conform to past experiences of impacts in other communities, and are colored by respondents' potentially unique attitudes, they are still important. Expectations may become self-fulfilling prophecies and say a great deal about the fears and attitudes of area residents. For this reason, Harbridge House conducted 110 interviews with residents of the ES Region in the summer of 1977. Responses from the key informants interviewed indicate that correlation of results were according to racial or ethnic group identity. Analysis separating respondents by county of residency, number of years of residence, and rural-urban distribution showed little correlation. Throughout responses the key factor was clearly racial or ethnic background. Consequently, the following sections will look at the three important ethnic groups in the impact area.

TABLE 3-14

HEALTH CARE SYSTEMS REQUIREMENTS, ES REGION, 1990, WITH PROPOSED ACTIONS

<u>Area</u>	<u>1990 Population</u>	<u>Physicians<sup>a</sup></u>		<u>Registered Nurses<sup>a</sup></u>		<u>Licensed Nurses<sup>a</sup></u>		<u>Dentists<sup>a</sup></u>		<u>Hospital Beds<sup>a</sup></u>	
		<u>Number Needed by 1990</u>	<u>Percent Increase with Proposed Actions</u>	<u>Number Needed by 1990</u>	<u>Percent Increase with Proposed Actions</u>	<u>Number Needed by 1990</u>	<u>Percent Increase with Proposed Actions</u>	<u>Number Needed by 1990</u>	<u>Percent Increase with Proposed Actions</u>	<u>Number Needed by 1990</u>	<u>Percent Increase with Proposed Actions</u>
McKinley County	80,600	130	3.2	310	3.3	93	3.3	47	4.4	322	3.5 <sup>b</sup>
Rio Arriba County- Coyote & Jicarilla CCD's	5,700	9	0.0 <sup>c</sup>	22	0.0	7	0.0 <sup>c</sup>	3	0.0 <sup>c</sup>	23	0.0 <sup>c</sup>
Sandoval County				24	4.3	7	0.0	4	0.0	25	4.2
Cuba CCD	6,250	10	0.0	348	3.3	104	3.0	52	2.0	361	3.1
San Juan County	90,350	145	2.8								
Valencia County- Fence Lake, Grants & Laguna CCD's	41,600	67	1.5	160	1.3	48	2.1	24	0.0	166	1.2
ES Region	224,500	361 <sup>d</sup>	2.6	864	3.0	258 <sup>d</sup>	3.2	130	2.4	898 <sup>d</sup>	3.0

Note: <sup>a</sup> The only areas where facilities met standards given in Table 2-19 were in Licensed Nurses and Hospital Beds in McKinley County.

<sup>b</sup> By 1990, McKinley County will still have a surplus over accepted standards.

<sup>c</sup> There were none for that area in 1977.

<sup>d</sup> ES Region totals may not add due to rounding.

Source: Harbridge House, Inc., based on population projections for 1990 with the proposed actions (see Table 3-2) for the ES Region, and Standards of the American Medical Association and U.S. Department of Health, Education, and Welfare.

Interview respondents were asked about the effects they foresaw upon themselves and their communities if the proposed actions were to take place. Their responses to these questions, as well as current trends and extrapolations from past experiences, form the basis of the analysis which follows.

### Anglo Residents

While there exists some ambiguity among Anglo residents of the ES Region toward the proposed developments, responses are generally favorable. Long-time residents of the area, many of whom have strong agrarian backgrounds, value their communities for what they have been. Particularly among those still living in small communities and among full- or part-time ranchers, the model of the western pioneer and the love of the open spaces are still valued. Native Anglos also value their family-centered life-styles, the neighborliness and low crime of their communities, and the lack of obvious "urban" problems. On the other hand, Anglos also believe in the need for economic growth and the development of services and amenities. Thus when asked whether the proposed actions would make the area a better or worse place to live, 47.7 percent of all Anglos thought impacts would be positive and only 15.9 thought they would be negative. Table 3-17 summarizes the responses of the interviewees to these questions.

Table 3-18 summarizes the major positive and negative effects that were viewed by Anglo respondents as likely to result from the proposed development. As can be seen, most of the anticipated positive impacts were of an economic nature. The relatively small number of other positive impacts that were anticipated were related to ways in which community infrastructure was thought likely to benefit. These responses suggested there would be more stores, improvements in public services, and increased support for cultural programs and other forms of entertainment. While projected positive impacts related almost entirely to perceived economic benefits, the anticipated negative effects dealt with a broader range of concerns. A total of 23 of the Anglo respondents anticipated that growth resulting from the development would place a strain on local public services. As discussed in Chapter 2, similar pressures are already being experienced by communities in all five counties, and it was expected that these pressures would grow with increasing migration resulting from energy-related developments. Other negative impacts that received frequent mention by the Anglo informants also had to do with community infrastructure.

Despite the fact that far more types of negative impacts were anticipated by Anglo informants, these respondents still expressed strong support for the planned developments on federal lands. Apparently the positive economic effects of proposed actions outweigh the numerous negative consequences in their minds. Yet, when the 43 Anglo respondents were asked whether they felt that the jobs created by the new development would go to locals or if outsiders would be imported to fill the



TABLE 3-15

POLICE AND FIRE PROTECTION REQUIREMENTS, ES REGION, 1990, WITH PROPOSED ACTIONS

<u>Area</u>	<u>1990 Population</u>	<u>Policemen<sup>a</sup> No. Needed by 1990</u>	<u>Percent Increase with Proposed Actions</u>	<u>Firemen<sup>a</sup> No. Needed by 1990</u>	<u>Percent Increase with Proposed Actions</u>
McKinley County	80,600	161	-- <sup>b</sup>	144	3.6
Rio Arriba County- Coyote & Jicarilla CCD's	5,700	11	0.0	10 <sup>c</sup>	0.0 <sup>c</sup>
Sandoval County- Cuba CCD	6,250	13	7.7	11	-- <sup>b</sup>
San Juan County	90,350	181	3.4	161	3.2
Valencia County- Pence Lake, Grants & Laguna CCD's	41,600	83	1.2	74	1.4
ES Region	224,500	449	3.0	400	-- <sup>b</sup>

Notes: <sup>a</sup>Number needed and percent increase figures reflect accepted standards given in Tables 2-20 and 2-21.

<sup>b</sup>Local staffing in 1977 exceeded standards for 1990 population requirements in some areas.

<sup>c</sup>No firemen reported locally in 1977.

Source: Harbridge House, Inc., estimates on the basis of standards of Federal Bureau of Investigation and International City Management Association.

TABLE 3-16

WATER SUPPLY AND WASTEWATER TREATMENT REQUIREMENTS, ES REGION, 1990, WITH PROPOSED ACTIONS

<u>Area</u>	<u>1990 Population</u>	<u>Water Supply<sup>a</sup> Average Use by 1990 (gallons/day)</u>	<u>Percent Increase With Proposed Actions</u>	<u>Wastewater<sup>b</sup> Treatment Average Use by 1990 (gallons/day)</u>	<u>Percent Increase With Proposed Actions</u>
McKinley County	80,600	13,379,600	3.5	4,415,300	3.5
Rio Arriba County- Coyote & Jicarilla CCD's	5,700	370,500	0.0 <sup>c</sup>	122,300	0.0 <sup>c</sup>
Sandoval County- Cuba CCD	6,250	406,300	2.5	134,100	2.5
San Juan County	90,350	14,998,100	3.3	4,949,400	3.3
Valencia County- Pence Lake, Grants & Laguna CCD's	41,600	6,905,600	1.6	2,278,800	1.6
ES Region	224,500	36,060,100	3.0	11,899,900	3.0

Notes: <sup>a</sup>use calculated using weighted average of urban and rural per capita rates for New Mexico.

<sup>b</sup>use calculated at .333 of water supplies.

<sup>c</sup>no systems existing in 1977.

Source: Harbridge House, Inc., estimates on the basis of information supplied by municipalities, consistent with New Mexico Energy Resources Board, Managing the Boom in Northwestern New Mexico, 1972.

positions, less than one-third (30 percent) felt that local residents would receive the additional jobs. Two reasons were most often given as to why this would be likely to occur. Thirty-three percent of the respondents indicated that outsiders would need to be imported because local residents did not possess the skills that the jobs would require. Thirty percent indicated that because of an already low unemployment situation, there simply were not enough workers available locally to supply the needs of major new employers.

At the conclusion of the interview, each of the respondents was asked if they had any other concerns and/or recommendations relating to the proposed development. The remarks made illustrate the degree to which, despite their support for development, respondents anticipate negative impacts. Ten of the Anglo respondents volunteered that they felt that pollution controls and standards should be enforced. Five others suggested that more attention should be given to reclaiming the land that was being disturbed by strip mining. Six of the interviewees expressed some concern that there was an increase in racial conflict that was traceable, at least in part, to the increasing contact and competition between the ethnic groups of the area that was being fostered by energy development.

The responses of Anglo informants suggest that these residents of the ES Region anticipate many problems from the proposed actions, but still endorse the developments as planned. There are some broader social and cultural concerns which few persons interviewed mentioned. If past trends continue, many of the Anglo newcomers who enter the five-county area to work on the various projects will come from metropolitan areas, outside the state of New Mexico. Unions often contact "support locals" in such cities to draw additional workers to the development site. Thus, the major factor which will affect the cultural values and orientations of residents would be the influx of workers with values and ways of life which are quite different from the rural/agrarian orientation of much of the present population. The pioneer and agrarian values held by native residents might conflict with the urban values of the newcomers. Moreover, the immigrants would, for the most part, be alien to the tri-cultural society of the ES Region, making misunderstanding of Hispanos and Indians and increased conflict more likely.

In addition to the conflicts of different cultures, there would be "boom-town-related" conflicts among Anglos. "Boom-towns" are characterized by few friendships and social ties or bonds between newcomers and long-time residents. The incoming workers would be set apart by the fact that they tend to be younger, have fewer children, and earn more than local residents (Little, 1976). The transient nature of construction and mining jobs would further hinder the development of social ties. All of these differences would tend to make social interaction more difficult. Anticipated deficiencies in public services, utilities, land use controls, and planning in the area communities suggest that all residents

TABLE 3-17

ATTITUDES OF RESIDENTS, ES REGION, TOWARD PROPOSED ACTIONS, 1977

<u>Impacts of proposed actions on</u> <u>liveability of ES Region</u>				
	<u>All</u>	<u>Anglo</u>	<u>Hispano</u>	<u>Indian</u>
Make a better place to live	36	21	8	7
No impact	42	12	6	24
Make a worse place to live	26	7	1	18
No Response	6	4	2	0
 <u>Impacts of proposed actions</u> <u>on respondents personally</u>				
Positive	41	24	10	7
Neutral	44	12	5	27
Negative	22	5	2	15
No Response	3	3	0	0

Note: Respondents totalled 110, with 44 Anglos, 17 Hispanos and 49 Indians.

Source: Harbridge House, Inc., interviews with key informants, 1977.

TABLE 3-18

IMPACTS ANTICIPATED BY RESIDENTS, ES REGION, FROM PROPOSED ACTIONS, 1977

<u>Desirable Impacts</u>				
	<u>All</u>	<u>Anglo</u>	<u>Hispano</u>	<u>Indian</u>
Increase in employment opportunities	60	18	8	34
Increase in business opportunities	29	16	9	4
Expand economic base	25	11	4	10
Other	11	8	0	3
No response	21	5	1	15
 <u>Undesirable Impacts</u>				
Overcrowding or degradation of lands	34	7	1	26
Environmental damage or pollution	33	12	3	18
Strain in public services	28	23	4	1
Diminution in water supplies	23	10	0	13
Housing shortage	20	12	7	1
Destruction of native cultures and values	19	1	1	17
Increase in crime	15	10	4	1
Increase in traffic	13	8	3	2
Worsening of racial and ethnic conflicts	13	1	0	12
Destruction of small-town neighborliness and trust	12	6	0	6
Overcrowding of schools	8	7	1	0
Increase in alcoholism	5	1	2	2

Note: Multiple responses were common. Respondents totaled 110, with 44 Anglos, 17 Hispanos and 49 Indians.

Source: Harbridge House, Inc., interviews with key informants, 1977.

would experience an added strain in coping with projected growth. Such conditions have been associated with crime, delinquency, and the breakdown of social norms in other boom growth communities like Gillette. As immigrants with different values and expectations follow patterns of behavior different from those accepted by long-time residents, given little social interaction between the two groups of people to help resolve conflicts, social conflicts and mental disorder would become more common and community consensus regarding common values and proper behavior would break down (Bureau of Reclamation, 1976b).

The larger cities in the area, such as Farmington and Gallup, might be better able to cope with social stress than more rural areas. A large number of voluntary social and special interest organizations give long-time and new residents an opportunity to interact and express their views. To a large extent, these associations serve to assimilate newcomers into the social structure of the city, and tend to alleviate the dissatisfaction and hostility felt by many new residents. The ability to become involved in the community and the feeling that one can make changes is valued by all residents of Farmington. If, as the city grows, the opportunity provided by local organizations to express dissatisfaction and resolve conflicts is closed off, or limited to a small portion of the population, many current and future residents would feel frustrated or angry. Conflicts between conservative long-time residents and more liberal newcomers would intensify and become more open if current channels of social integration become clogged.

#### Hispanic Residents

Past trends indicate that Hispanic-Americans in the five-county ES Region have been leaving the rural area, abandoning traditional Hispanic ranching life-styles, to migrate to cities in search of work. To the extent that the proposed actions would provide Hispanic residents of the ES Region with employment opportunities near their present homes, some Hispanos would be able to maintain their traditional way of life and cultural values. However, major population increases are projected because of the cumulative extent of planned development. The vast majority of incoming workers associated with the proposed actions would be urban Anglos from outside New Mexico. Their arrival would further upset the long-standing balance between Hispanic and Anglo residents; Hispanos would become a smaller minority group in the area. Hispanic political power would be weakened; some communities in which Hispanic residents have traditionally held positions of formal and informal control might fall under the influence of Anglo newcomers.

If this occurs, as it has in other parts of the Four Corners area, Hispanos might react with anger and frustration, isolating themselves from the newcomers, and opposing changes in the community. However, respondents to the survey of key informants did not suggest that such conflict was imminent. Hispanic responses to the questions concerning

the ultimate impact of the proposed development on their communities and on themselves closely paralleled those of the Anglo respondents. Indeed, in many respects, Hispanos were more often in favor of the proposed actions than Anglos. Of the 17 Hispanic informants, 53 percent felt that the impacts on their own lives would be positive while only 11 percent anticipated negative personal impacts.

Table 3-18 summarizes the major positive and negative effects that Hispanic respondents anticipated might occur in their area if the proposed development were to proceed. Even more so than was true with the Anglo respondents, the Hispanic interviewees felt that the positive impacts would be of an economic nature. Nine of the 17 persons interviewed from this group suggested that business opportunities in the area would improve. There was a much more diverse range of responses, regarding negative impacts, as was the case with Anglo respondents. The major concern identified was a fear of an aggravated housing shortage. Like Anglos, Hispanos projected increased strains on public services, increases in local crime, worsening traffic congestion, and damage to the land and environment. Potentially higher alcoholism rates were also identified as probably impacts. The same pattern that held among the Anglos is evident among Hispanic residents. More negative than positive impacts were identified by respondents but, this imbalance notwithstanding, they still view the overall effect of planned developments as being favorable for their communities and for themselves. Apparently, again, the economic factors are carrying a greater weight than other concerns with these inhabitants of northwestern New Mexico.

But, contrary to what was true among Anglo interviews, Hispanic respondents were likely to feel that most of the new jobs created by the proposed actions would be taken by local residents. Almost half (47 percent) said the jobs would go to locals. Of the remainder, 35 percent said they would go to outsiders and 18 percent were uncertain. Lack of skills and low local unemployment rates were again identified as principal reasons why more of the jobs would not be taken by local residents. In this instance, however, a new factor emerged that was not evident among the Anglo respondents. A total of 17 percent of the Hispanic respondents said that more jobs would not go to locals because of discrimination by the companies. If Hispanos do not obtain anticipated employment benefits from the proposed development, they would likely react with a great deal of frustration and anger. Hispanos seem to be more and more conscious of discrimination and resent policies that favor the hiring of Navajos on the energy development projects. As rural Hispanos have greater contact with Anglos, and face the problems caused by population growth and resource development, they may become more aware of, and concerned about the issue of prejudice. In this event, Hispanos might become more politically active in an attempt to overcome perceived discrimination.

## Indian Residents

It has been noted in Chapter 2 that the cultural values and attitudes among Indians, particularly more tradiitonal Indians, differ in many respects from those of Anglo or Hispano residents of the study area. Because of these differences, the general impacts on Indians of the proposed development are likely to be felt far more strongly and effects on cultural values and beliefs to be perceived as more important. At the same time, it must be emphasized again that Indians do not constitute a single homogeneous group. Even among one tribe -- the Navajo -- many residents of large communities like Shiprock or of off-reservation areas have moved toward acceptance and even adoption of non-Indian lifestyles. Consequently, there are significant distinctions between these Indians and the more isolated inhabitants of rural and reservation areas who frequently speak little or no English. These differences are reflected in the responses of the 49 Indian interviewees who were contacted for the survey.

While Anglo and Hispanic respondents tended to view the proposed development positively, the opposite was the case among Indians interviewed. Table 3-17 summarizes responses to the two related questions concerning whether the proposed development would make the area a better or worse place to live and whether the effects for the individual respondent are likely to be positive or neutral. While over 50 percent of both the Anglo and Hispanic respondents stated that the projected development would have positive impacts on their communities, this was true of only 14 percent of the Indians. While almost half of the Indians felt that their area would be little changed by the development, 37 percent felt that things would get worse, a much higher percentage than was true for the two other cultural groups studied. Similarly, only 14 percent of the Indian respondents projected that positive impacts for themselves would result from the proposed development.

Table 3-18 summarizes those items which were identified as potential positive and negative impacts from the proposed actions. As was true for other cultural groups, positive impacts were defined primarily in economic terms. Thirty-four of the 49 respondents said that more local jobs would be created and an additional 14 referred either to an expansion of the local economic base or to new business opportunities. However, 15 respondents were unable to imagine any positive aspects of proposed coal and coal-related development. Potential negative impacts noted by the Indian tend to cluster around several major, but related, concerns. A total of 6 of the 49 respondents said that the proposed development would contribute to an overcrowding of the land. Eighteen others made similar comments by noting that the land and the environment would be damaged. Almost as many (17) feared the destruction of traditional cultural values. Thirteen respondents expressed concerns about negative impacts on the availability of water and 12 felt that the influx of outsiders to the area for employment in the proposed development would increase prejudice and discrimination directed toward the Indian.



As described in Chapter 2, Indians view their land with great reverence. Therefore, it is not surprising that their primary concerns revolve around potential impacts on that land and its limited water resources. If the land is greatly altered, the way of life of the people must also be greatly altered and highly valued traditions and life-styles will be lost. These concerns appear to be paramount among Indian respondents.

In summary, the negative impacts which Indian respondents anticipated included the arrival of strangers who neither respect nor understand their way of life, exploitation of fragile land and water resources, and consequent major impacts of traditional values and life-styles. Positive impacts were associated primarily with the potential of increased employment opportunities. Clearly, the Indians interviewed were apprehensive about the effects that the proposed actions will have on them. Although the potential economic benefits would be welcome for a people as economically deprived as most of the Navajo tend to be, the negative impacts make the trade-off a less attractive one.

As was true with the Anglo respondents, a majority of the Indians contacted anticipated that jobs created by the development would go to outsiders (56 percent felt that this would be the case). However, the Indians were much more likely to feel that this would be the case because of discrimination by the energy companies or by labor unions. Fifty percent of those who felt that the jobs would go to outsiders felt this was the case because of discrimination. Others (about 40 percent) agreed with the Anglo and Hispanic respondents that many jobs would go to outsiders because of the fact that required skills could not be found locally. A final question concerning whether they had anything else to add also resulted in a rather interesting response pattern by Indians interviewed. Twelve volunteered that all parts of the local community, particularly tribe members, should be included in any planning for future developments in the area. An additional eight observed that if the development were, in fact, to occur, there should be some guarantees that the Indians would benefit. Seven Indian respondents expressed personal appeals for additional safeguards to protect the land and the water from further abuse and deterioration.

An objective assessment of impacts of proposed actions on quality of life among the Indian tribes cannot be complete. It is impossible to evaluate the extent to which spiritual values will be lost, for example. Even standard indicators are judged with difficulty. It is difficult to predict the number of people who would migrate from and to Navajo communities in response to the proposed actions. It is likely that some of the developments would attract Navajo from other parts of the reservation to Shiprock, Crownpoint, and other eastern communities near development sites. If they should do so, competition might arise between native and new residents over jobs, particularly over the non-skilled jobs for which most Navajo would be qualified. Furthermore, housing is in short supply. It is not uncommon for a nuclear family living in an apartment or small house to have relatives stay with them for a long period of time raising the number of persons per room to three or more.

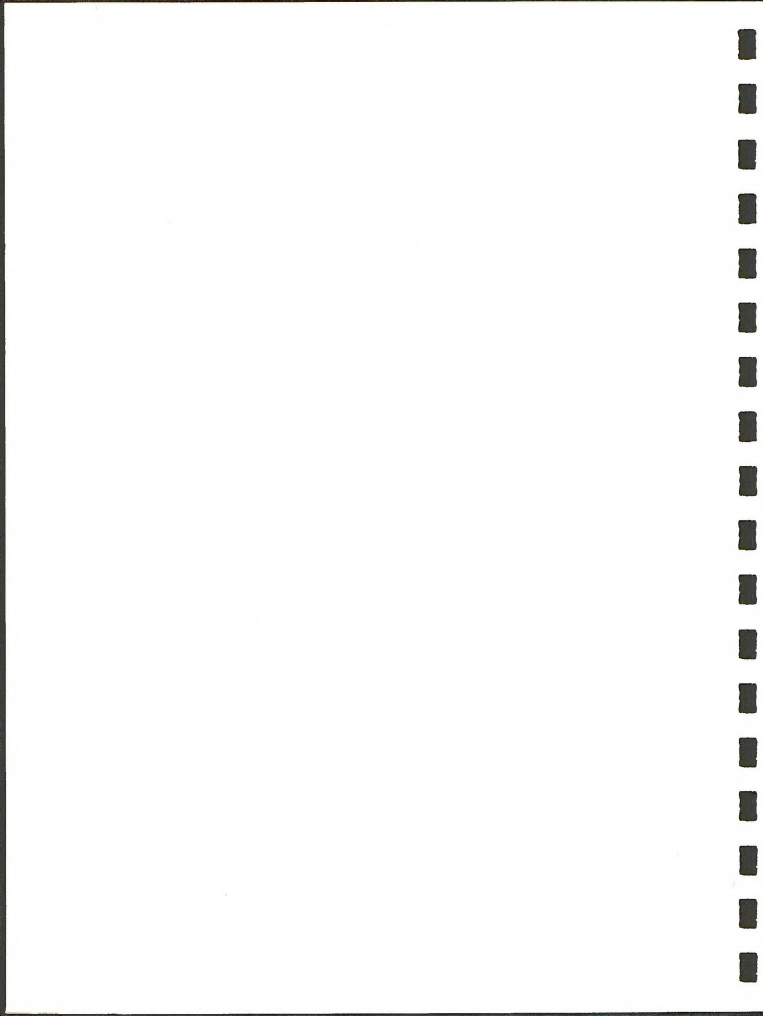


It is possible that Indians who migrate to communities near the development would expect to stay with relatives already in residence. The open land and socially defined pattern of relationships enables traditional rural Indian families to maintain extended family residences with minimum conflict. In larger communities influenced by Anglo life-styles, such as Crownpoint and Shiprock, these traditional norms have broken down somewhat and little open space exists. Since the family is the basic unit of traditional Indian culture, any lessening of family bonds would hasten the rate at which Indians, particularly a young Indian, become acculturated to non-Indian society.

Indians who lose their land to the proposed developments, including unauthorized occupants of public lands, or who can no longer continue herding activities, would be forced to abandon traditional life-styles. There is little available land to which they can relocate, and certainly there is not enough land for an entire extended community. These people would experience social dislocation as they are separated from people and land with which they are familiar.

A major sociocultural impact which the proposed developments would have on Indians would be the urbanization and industrialization of previously rural communities. Traditional kinship, religious, and other institutions in the Indian cultures are adapted to household agricultural and livestock production for the family's own use. These institutions have been weakened by Anglo conceptions of material wealth since the Anglo cultural influence gained a firm hold on the region a century or more ago. However, many Indian households are still dependent on their own production for part of their own subsistence, and therefore depend on extended kin networks for labor cooperation, rights to land and water, and other economic benefits. The proposed actions on public lands might provide Indians with well-paying, non-agricultural employment. Indians could choose to depend on wage work instead of subsistence agriculture. If they should do so, traditional life-styles would change. Rural agriculture which has been the traditional mainstay of the Indian culture and social structure would become a less important source of livelihood. But the availability of jobs close to the Indian homes on reservation and allotted lands would enable individual Indians to remain within their own society and in their homeland rather than migrate to urban, Anglo areas in search of work.

In the short term, social and cultural stress would result from the proposed actions; the long-term impacts might not be so severe. The Indian tribes of northwestern New Mexico have, in the past, demonstrated a capacity to accept innovations while retaining those aspects of their cultural heritage which they find most salient. The current rise in ethnic pride and identity among Indian young people is an indication of the importance of their culture to the people. The jobs and economic prosperity which the proposed actions would create could enable Indian inhabitants of the ES Region to become more self-sufficient, increasing Indian pride and independence.



CHAPTER 4

MITIGATING MEASURES

TABLE 4-1

RENTALS, ROYALTIES, AND BONUSES FROM  
PROPOSED ACTIONS TO BE RETURNED TO NEW MEXICO  
(millions of Dollars)

<u>Purpose</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Exclusively for highways and schools	1.2	10.8	14.0
For all uses (planning, building, and maintenance of public facilities, and provision of public services)	0.4	3.6	5.0
<b>TOTAL</b>	<b>1.5</b>	<b>14.4</b>	<b>19.0</b>

Notes: It was assumed that:

- (1) New lease royalties will average 10 percent of value of coal at \$13.50 per ton.
- (2) New lease bonuses will average 20c per ton.
- (3) Rentals are credited against royalties.

Sources: Harbridge House, Inc., 1978.

## CHAPTER 4

### MITIGATING MEASURES

#### SOCIOECONOMIC CONDITIONS

Adverse impacts on community infrastructure and quality of life constitute the majority of those negative social and economic effects of the proposed actions identified in the preceding chapter. Consequently, most of the measures discussed below would mitigate anticipated shortfalls in local revenues and attempt to lessen deficiencies in road conditions, the supply of housing, and available public services, including education and health care systems. In so doing, the strains which lead to the social behavior in boom-towns, labeled the "Gillette Syndrome," would be lessened, and adverse impacts on individual and collective well-being would be minimized. In general, these measures seek to mitigate negative effects of developments on federal lands by increasing funding for community planning, capital investment, and program expansion. In this respect, mineral royalties from proposed leases would provide a major means of mitigation. Under present laws and regulations, the federal government would be the only certain source of funds to impacted communities, as detailed below. Severance taxes and other revenue sources related to minerals development might also add to funding. But, the effectiveness of other resources of money would depend upon the degree to which the state government recognized and anticipated the needs of local governments of northwestern New Mexico.

Inevitably, the process would appear to involve political considerations, both at the stage at which grants-in-aid are made, and at the points at which the monies received are allocated to specific purposes. In distributing assistance to impacted communities, all present New Mexico statutes and authorities allow for discretion in disbursement and hence fail to guarantee that relative funding would match relative needs. Consequently, the state funding mechanisms mentioned here cannot be viewed as entirely committed, although some monies would probably flow to counties, municipalities, and regional councils of government by these means. Of the several funding sources discussed below, only one would appear to be very likely to contribute significantly to mitigation of adverse impacts: Section 35 of the Minerals Leasing Act of 1920, with the amendments of 1976. This is the case despite the recent passage of two New Mexico state acts which will probably make a great contribution to available funds for impacted localities in the ES Region.

The New Mexico Community Assistance Authority Act, which became law in 1977, is intended to provide as much as \$10 million in grants-in-aid to communities located in areas experiencing rapid resource development.

These funds would be released for most types of capital investment required to deliver normal public services, including water supply, wastewater treatment and solid waste disposal. The criteria to be employed in apportioning the monies would focus upon the health and safety of residents, in light of other possible sources of funding. It is expected that the \$10 million appropriation will be committed almost exclusively to projects in northwestern New Mexico. Testimony prior to passage of the act suggested that McKinley, San Juan, and Valencia Counties are likely to receive the bulk of these funds. But the \$10 million is expected to be entirely expended by 1979. The act would not therefore contribute greatly to mitigation of adverse impacts from the proposed actions, few of which would be far beyond the planning stage in 1979. The funds supplied by the act will help to meet some of the need for \$119-224 million in new services and facilities which are projected to be needed in the next 2 to 5 years (Energy Resources Board, 1977; McKinley Area Council of Governments, 1977). But this need would exist even in the absence of the planned developments on federal lands. Therefore, the provisions of the New Mexico Community Assistance Authority Act would not appear to constitute mitigation, except insofar as they would improve base conditions on which proposed actions would have impacts.

The New Mexico Severance Tax Act took effect on July 1, 1977, amending and replacing the former severance provisions enacted in 1953. The effect of the new act was to raise the severance tax on steam coal to \$.38 for each short ton (2,000 pounds). The consequence of the legislation will be to generate more revenue for the state; in 1980, the new provisions would generate an additional \$12.1 million from the mining of steam coal. This would represent a gain of approximately 62 percent. For the proposals involving federal mineral properties, the New Mexico Severance Tax Act of 1977 would result in markedly higher taxes paid to the government of New Mexico. Given the intent of legislators who drafted and enacted the law, this money would then likely be made available to impacted communities. However, this source of funding would not be a certain means of mitigating adverse impacts. While the Act would provide, on a cumulative basis, hundreds of millions of new tax revenues to the State of New Mexico, there is no guarantee that these funds would be utilized in the ES Region for needs projected in Chapter 3. The act does not contain internal, automatic funding mechanisms, but rather leaves disbursement of revenue to be determined by other legislation, similar to the New Mexico Community Assistance Authority Act of 1977.

Thus, severance taxes, like other sources of state and local government revenue, would be increased by the proposed actions. The additional funds might be used to mitigate adverse impacts, but cannot be considered as real or committed at the present time. There are proposals in the New Mexico Legislature to enact more comprehensive assistance legislation, insuring that impacted areas would be aided with taxes gained from developments like the proposed actions. But until the actual passage of such acts, the only definite source of funds for mitigation will remain Section 35 of the United States Mineral Leasing Act of 1920, as amended in the Coal Leasing

Act of 1976. The provisions of the federal law require the Secretary of the Interior to return 37.5 percent of all monies received as rentals, royalties, and bonuses in leasing mineral properties. These funds, which are to be turned over to the governments of states in which leases are located, must be used exclusively for improvement and construction of highways and schools. An additional 12.5 percent of the rents, royalties, and bonuses are to be returned to states for use in planning, building, and operating public facilities and providing community services in general. These funds are committed to the mitigation of adverse impacts by law.

A 50 percent share of rents, royalties, and bonuses due the federal government from the leasing of properties in northwestern New Mexico outlined in Chapter 1 would provide the State of New Mexico with an estimated \$1.6 million in 1980, \$14.4 million in 1985, approximately \$19.0 million in 1990, as shown in Table 4-1. Total revenues from this source would exceed \$277 million during all proposed leases. This amount would make a significant contribution to the mitigation of adverse impacts on community infrastructure, and hence on social well-being. Given projected local government needs for \$17.1 million in 1980, funds available through Section 35 would contribute 9.4 percent of revenue requirements in that year. Funds could be used to correct the deficiencies in road networks, to expand the supply of housing, to improve public education and health care, to upgrade police and fire protection, and to provide basic utilities. However, a large deficit would still exist in 1980, with more financing needed for programs, facilities, and services. Section 35 funds would add \$1.6 million to increased local taxes of \$1.7 million, leaving \$13.8 million to be raised by other means. By 1990, accrual of royalties would have exceeded local needs for fiscal assistance. But in 1980, the lack of "front-end" financing would remain a problem in the ES region.

One difficulty with the provisions of the Minerals Leasing Act, even as amended, is that it uses state governments as intermediaries between the federal authorities and local authorities in the affected regions who would be most likely to need monies. The funds to be supplied by Section 35 are to be turned over to the states with an understanding that priority for their use be given to those subdivisions of the state which have been or are being socially and economically impacted by development of minerals leased under the Act. The legislation suggests that "those subdivisions of the State, socially or economically impacted by developments of minerals leased under this Act" be the first to receive monies. But there is no assurance that the State of New Mexico would promptly and fairly distribute the funds it would receive under the terms of the Minerals Leasing Act. Delays of a year or more have been experienced elsewhere in the distribution of these funds to needy local governments. Furthermore, the distribution of funds obtained from mineral leases under the provisions of Section 35 might be inequitable, with some counties and communities which have experienced little or no impacts from development receiving a large



share of funds. Given the fact that the ES Region does not now possess a majority of the representatives in the New Mexico legislature, there is little assurance that political pressures from the delegations of other parts of the state would not influence the distribution of federal funds, to the detriment of northwestern New Mexico.

A further, and more serious, problem with the revenues resulting from Section 35 of the Minerals Leasing Act is that they would, for the most part, accrue only after operation of facilities had begun -- and after most social and economic impacts had been experienced. As noted above, financing needs would be greatest in 1980 as governments seek to meet and anticipate rising demand on infrastructure. However, most Section 35 funds would not be available until later, after adverse effects of proposed actions. For this reason, the Federal Land Policy and Management Act of 1976 included the provision that the U. S. Government could make loans to states and their subdivisions to assist in relieving the social and economic impacts of mineral development. This authorization, contained in Section 312, is limited to the amount of mineral revenues expected to be received over the life of the proposed mines. But even with this limitation, the terms of the Act open a major source of funding to impacted areas. While it is not possible to predict how much of the greater than \$1 billion in projected rentals, royalties, and bonuses from northwestern New Mexico the Secretary of the Interior would be willing to authorize by way of loans, he would possess the authority to loan up to the anticipated total. This might be one means of mitigating the \$14.8 million shortfall in local government revenues in 1980. Moreover, the loans could be arranged with counties, municipalities, school districts and other public authorities directly and for specified purposes, insuring that the funds would be used effectively for mitigation of adverse impacts. By drawing on projected income from minerals property, the Department of the Interior could help communities accommodate population increases and preserve social well-being.

In addition to funding provided by the U. S. Department of the Interior under the terms of the Minerals Leasing Act and the Federal Land Policy and Management Act, there would be numerous sources of federal grants-in-aid for which counties, municipalities, and public authorities in the ES region might be eligible. Assistance might be obtained from discretionary funds administered by the U. S. Departments of Health, Education and Welfare; Housing and Urban Development; Justice; and Transportation. Among community facilities and services which might benefit would be housing under Sections 207 and 213 of the National Housing Act of 1955 which provides for financing of mobile home parks under guaranteed loans and of cooperative housing complexes, and under the National Housing Act of 1949 which provides direct as well as guaranteed loans for construction, repair and purchase of homes; schools, under Public Laws 81-815 and 81-874, as amended, which supply funds for construction, operation and maintenance of facilities; health care institutions, under the program of the Public and Indian Health Services; police protection, under the Omnibus Crime Control

and Safe Street Act of 1968, as amended; and public services, under terms of the Federal Water Control Act and other legislation. However, while there is a likelihood that some grants from these sources would be made, funding would be at the discretion of agencies and could not be guaranteed. Moreover, several circumstances might limit availability of funds. Their distribution would be based on Census data which do not reflect recent rapid population increases; preference is also given to communities with low per capita incomes, but the proposed actions would have the effect of pushing incomes higher. In addition, local governments often lack the expertise to obtain benefits from the federal bureaucracy. For all these reasons, the sources of funding listed above could not be relied upon to mitigate adverse fiscal impacts from planned developments.

A number of specific adverse impacts of planned developments would require special forms of mitigation. Chief among these would be relocation of legal residents and unauthorized occupants of lands leased by applicants. Although some of the pain and confusion surrounding a move from an established home cannot be eliminated, adherence to certain procedures regarding relocation would assist families now living on sites of proposed actions. The procedures could be defined by the terms of Uniform Relocation Assistance and Real Property Acquisition Act of 1970, which together with other federal acts and regulations, govern the relocation of displacement of individuals with respect to government projects. These rules have applied in the past only to landowners whose property is taken by the government; in order to protect the Indians whose lives would be disrupted by the proposed actions, a stipulation in leases that applicants assist them in relocation would be necessary. Although a total of only 200 to 240 persons would have to be relocated due to the proposals, measures to expedite their move and to aid in their reestablishment elsewhere would help to mitigate direct personal hardships associated with the planned developments.

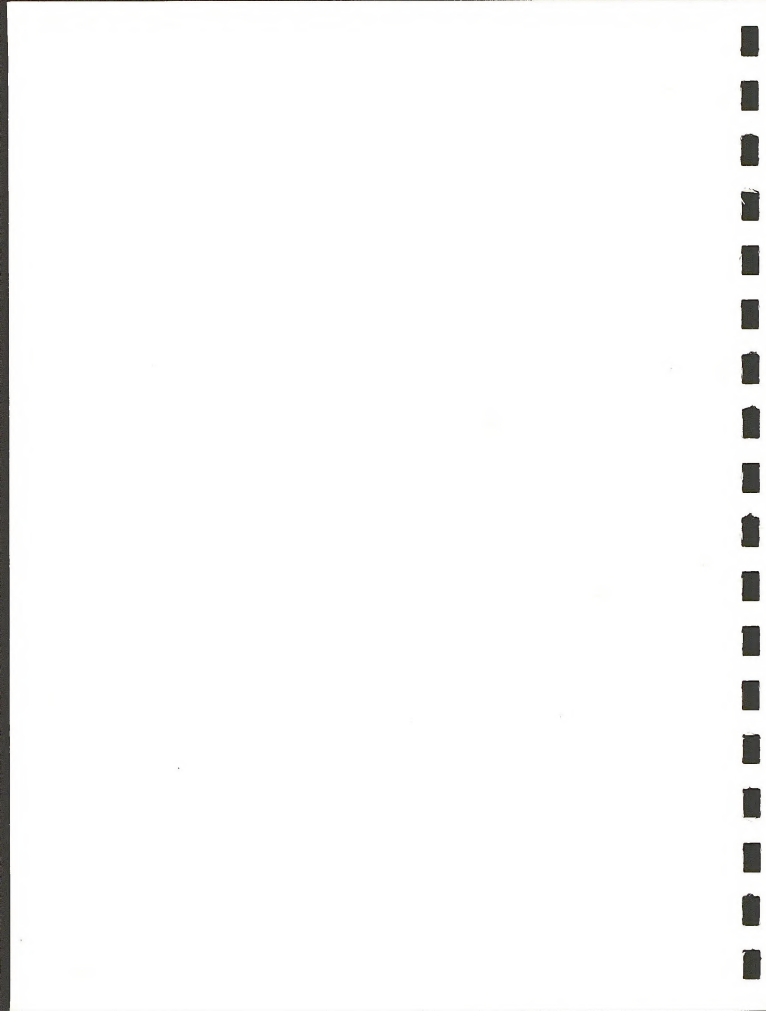
Mitigating measures of this kind would also reassure Indian residents of the area as to the intentions of the government and leaseholders. The Harbridge House survey of key informants in the area of project sites identified among Indians a frequent feeling that information regarding proposed actions was being withheld from them, that planning was proceeding without regard for their desires, and that they were powerless to stop the despoliation of their homeland (see Chapters 2 and 3 for specific breakdowns of responses). Respondents spoke of their increased apprehension due to plans for development in the area; of those who identified what they specifically disliked about their community at present, 50 percent mentioned the development which is occurring. Twenty-eight Indians insisted in added comments that plans for mining of federal properties be discussed in open meetings in the chapters and that probable social and economic impacts be outlined clearly. If companies could be committed to hiring as many Indian and Hispanic workers as possible, adverse impacts on ethnic and racial conflict might be mitigated. As discussed in Chapter 31, these groups could become angry if they fail to profit from development in their communities, and yet still experience the

adverse effects of industrialization, immigration, and urbanization. However, it cannot be predicted how many skilled members of these minorities would be available for hire, nor how great the demand for trainees in Navajo tribal programs would be. Therefore, stipulations as to company hiring would probably not be practicable.

Finally, while it might not prove possible to commit applicants to specific standards of mine safety and worker protection, regulations and inspections of the Mining Enforcement and Safety Administration (MESA) should mitigate the chance of accidents, and so minimize the number of persons injured.

CHAPTER 5

UNAVOIDABLE ADVERSE IMPACTS



## CHAPTER 5

### UNAVOIDABLE ADVERSE IMPACTS

#### SOCIOECONOMIC CONDITIONS

The proposed actions would have several important and unavoidable adverse impacts on communities in northwestern New Mexico. To the extent that the projected \$13.8 million shortfall in local government budget could not be mitigated by assistance from the sources discussed in the preceding chapter, there would be unavoidable adverse impacts on services and facilities throughout the ES Region, and consequently on social well-being. Shortages of above standard housing, of teachers and classroom space, of health care professionals and facilities, of police and fire protection, and of water supply, wastewater treatment and solid waste disposal mechanisms would contribute to a degradation of quality of life. Individuals would be adversely affected and social disorders would multiply, reflected in all those indicators which in past "boom-town" situations have pointed to the so-called "Gillette Syndrome." Projected growth of the ES Region in the absence of the proposed actions would also promote the development of these problems. Consequently, the mines, power plant and railroad requiring federal approval would contribute, but not be the sole cause of, negative social conditions apparent in the study area.

Whether or not local public financing could anticipate population increases and resulting growth in demand on community facilities and services, certain adverse impacts would be unavoidable. The small-town atmosphere and close personal contacts valued by long-time residents of communities in the region would be lost as cities and villages grew in size. Boomtowns are characterized by few friendships, social ties, or bonds between newcomers and long-time residents. The effects of development could be below the expectations of local residents, while the lack of facilities and urban amenities would dissatisfy some newcomers. Although workers might come from nearby states and possess some shared values such as self-reliance and enjoyment of outdoor activities, they would differ from native or long-time residents in other respects, such as a perceived role of government in planning and controlling development, for example. Immigrants would tend to be younger, better educated, have fewer children, and receive more income than local residents (Little, 1976; Mountain West Research, 1975). The transient nature of many jobs in construction and mining would hinder the development of social ties. Newcomers would often be members of different religious groups than local residents, or might have no religious affiliations at all. All of these differences would tend to make social interaction more difficult.

Immigrants attracted by resource development would, for the most part, be urban, Anglos from outside New Mexico. Hence, immigration would diminish

the relative size of native Hispanic and Indian minorities. Conflicts between ethnic and racial groups would multiply as populations expanded. Politically, communities would witness struggles between long-time Anglo inhabitants and newcomers, and between Anglos, Hispanos, and Indians due to the differing values and objectives of each group. Political issues would center on tax burdens and planning controls as these evolve in response to growth pressures. Even if adequate community services and facilities could be operational prior to influences of immigrants, increases in social disorders would still be observed and would be greater than the rate at which populations would grow. This would stem from an observed phenomenon of population growth that increased size itself results in greater rates of crime, alcoholism, and mental disorder. Different attitudes of newcomers to their job situations, their new communities, and to means of entertainment -- those of persons who are perceived and perceive themselves as newcomers -- would compound the development of these problems.

Hispanos and Indians would encounter growing social and economic pressure to conform to Anglo values and life-styles. To the extent that members of these minorities would share in increased employment and earnings related to coal and coal-related actions on federal lands, they would be drawn into an English-speaking wage-work culture in which individual advancement and competition are stressed. The contradictions of two cultures would have adverse impacts on the well-being of individuals, and disorderly conduct, alcoholism, and psychological distress would be likely to result. For the Navajo, especially inhabitants of the Eastern Navajo Agency, impacts would be greater. The mining of properties in their midst would affect spiritual values of the Indian population. The Navajo view the land with great reverence, and endow the physical features of northwestern New Mexico with religious significance. The extent to which mining would intrude upon spiritual relationships and interfere with the natural order, as Indian religions would suggest, cannot be predicted. However, the industrialization of now rural areas and the urbanization of presently small communities would disrupt the pastoral, agrarian life-styles which Indians have traditionally valued and around which their cultures have developed.

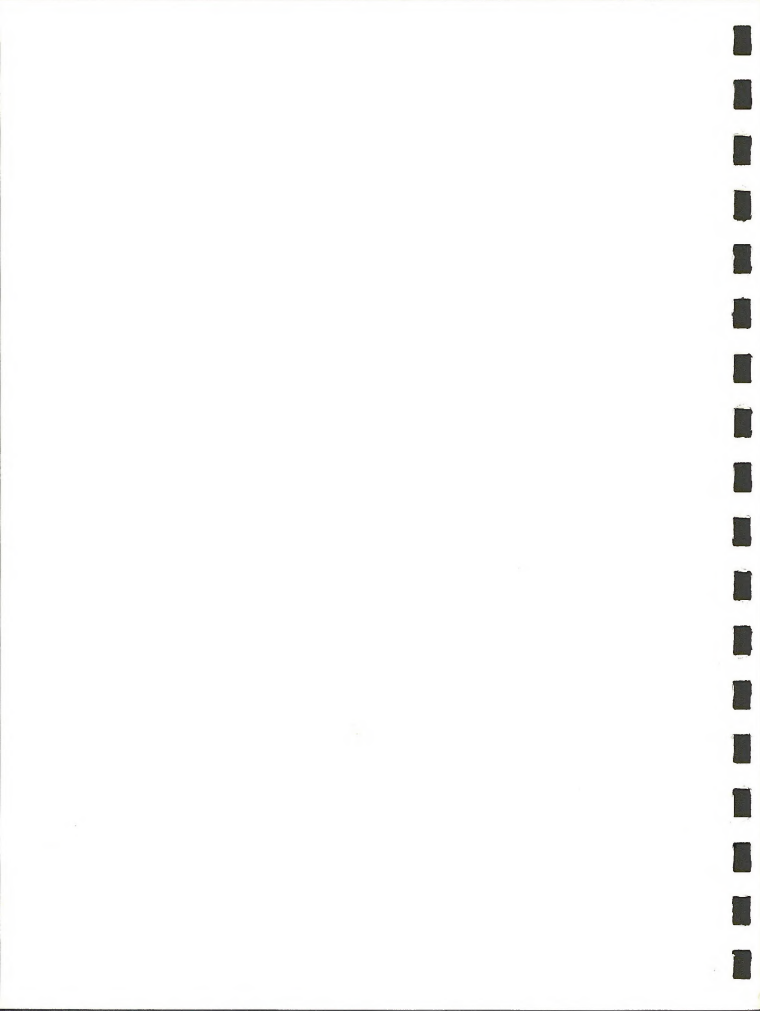
To the extent that Hispanos and Indians would not directly benefit from the proposed actions, whether because of lack of skills or because of active discrimination, feelings of deprivation and hostility would result, and opportunities for conflict between the three cultural groups of the ES Region would increase.

More specific adverse impacts on certain segments of the population would also be unavoidable. Of the legal residents and unauthorized occupants of lands that would be involved in planned actions, 200 to 240 would be relocated. Even if relocation procedures are equitable for all these inhabitants, moves to new homes would still involve inconvenience and distress for those involved. There would also be several unavoidable adverse economic effects on the region. For residents living on fixed incomes and those in lower income brackets, projected increases in total



employment and gross earnings would tend to increase the cost of living. While others with negotiable, higher wage incomes would be experiencing periodic income gains to keep pace with inflation, those with fixed incomes or in jobs at the bottom of the pay scale would be less able to do so. Consequently, they would suffer from cost of living increases. A rising index of living costs would stem directly and indirectly from large-scale expenditures associated with proposed actions. Capital investment and personnel hiring would result in too many dollars chasing too few goods and services. Inflation would also be due to the deficiencies in community infrastructure, such as roadways, and resulting increases in cost. Eventually new businesses, services, and support systems would develop to meet demand, but the cost of living would likely rise in the initial years of investment and immigration.

Proposed actions would have unavoidable adverse impacts on health and safety. The increased number of accidents at coal mines would result, estimated at 1,625 nonfatal coal mine injuries and 18 fatalities in 1990, according to statistics of the Mining Enforcement and Safety Administration.



CHAPTER 6

RELATIONSHIP BETWEEN SHORT-TERM AND LONG-TERM

PRODUCTIVITY OF THE ENVIRONMENT



## CHAPTER 6

### RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY OF THE ENVIRONMENT

#### SOCIOECONOMIC CONDITIONS

The ES Region would experience population increases and economic growth in the absence of proposed actions on federal lands in the area. The planned developments would accelerate rates of change and would contribute to problems of communities, racial and ethnic groups and individuals. An assessment of the trade-offs which would be involved between short-term deficiencies in community infrastructure and resulting degradation of quality of life and long-term gains in per capita income, facilities and services, and social well-being is tied to the biases of each observer. It is possible to note what would be lost in the process. Among the unavoidable adverse impacts discussed in the previous chapter, the loss of the agrarian and small-town atmosphere of present communities, increasing social and political conflicts between newcomers and natives, Anglos, Hispanos and Indians would be aspects of the short term. Eventually, more urban life-styles, values, and attitudes would be generally adopted by inhabitants of northwestern New Mexico, and the distinctions between groups within the community would have been blurred by contact and participation in a common economy dominated by Anglo concepts of work and leisure, competition, and compensation.

The proposed actions would provide employment directly and indirectly to 6,735 workers, and support economically as many as 1,865 households, thereby enhancing the long-term productivity of more than 12,000 persons. However, the immigration associated with the economic opportunities created by proposed actions would result in temporary problems. In the short-term, community services and facilities would be strained as demands from increasing populations exceeded capacities. Eventually, as local government revenues increased and sufficient time passed in which to build new features of infrastructure, the situation would stabilize at new levels of use and need. However, certain adverse effects would be permanent consequences of approval of proposed actions. Among these would be traffic congestion, urban crowding, and those social disorders which increase at a faster rate than population as the number of inhabitants rises; the latter would include most crimes, alcoholism, and mental problems. In addition, the minority cultures of the five counties, the Hispanic and the Indian, would be weakened both by opportunities to be employed in situations in which Anglos predominate, and by Anglo immigration into areas once largely inhabited by Hispanos or by members of Indian tribes. Both Hispanic and Indian cultures would respond and develop, altering in some ways while holding to certain values and beliefs. The trade-offs for these groups

would be between gains in employment and earnings associated with development, and the cultural change which would accompany additional jobs and expanded incomes.

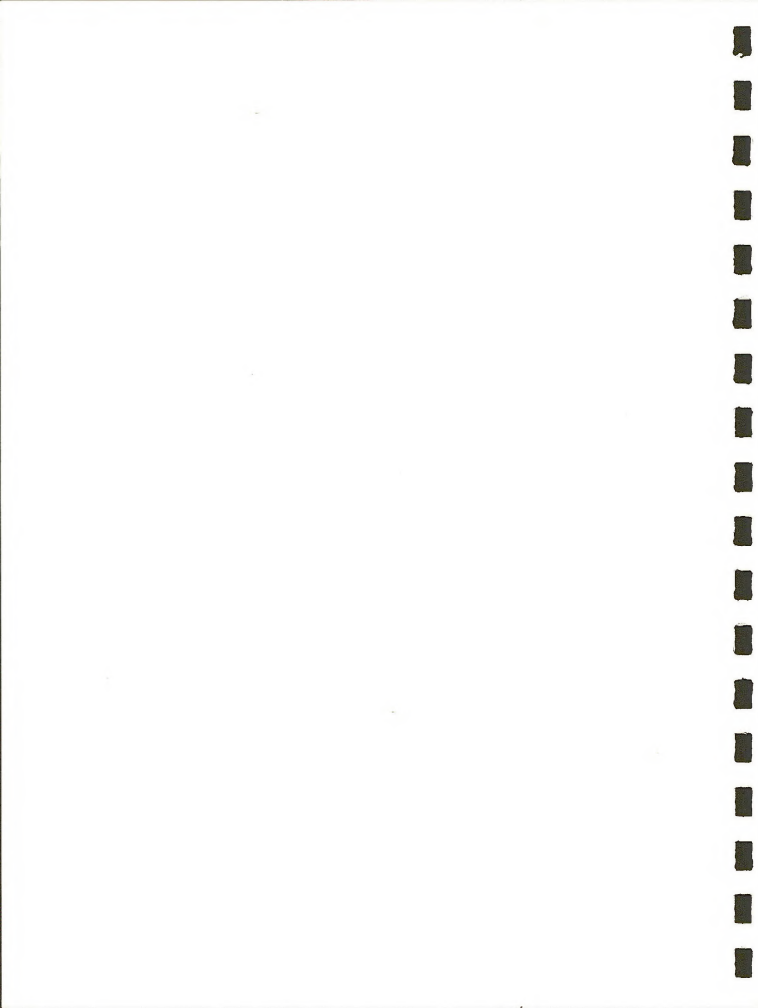
The economy of the ES Region would be subjected to short-term disequilibrium as large-scale investment and hiring would pump increasing amounts of money into the area. Adverse impacts on labor turnover, costs of production and living costs would result. However, ultimately the regional economy would have absorbed and adjusted to these elements of change, and cost of living would stabilize, as would other economic indicators, including rates of job turnover in the labor force. The short-term use of the environment for the development of coal mining would result in a long-term dependence of the regional economy on mining as a base industry. If changing market conditions were to cause a substantial drop in the price of steam coal, and if no efforts are made to increase the diversification of the economic base of the region, the five-county area would experience a severe, local recession.

CHAPTER 7

IRREVERSIBLE AND IRRETRIEVABLE

COMMITMENTS OF RESOURCES





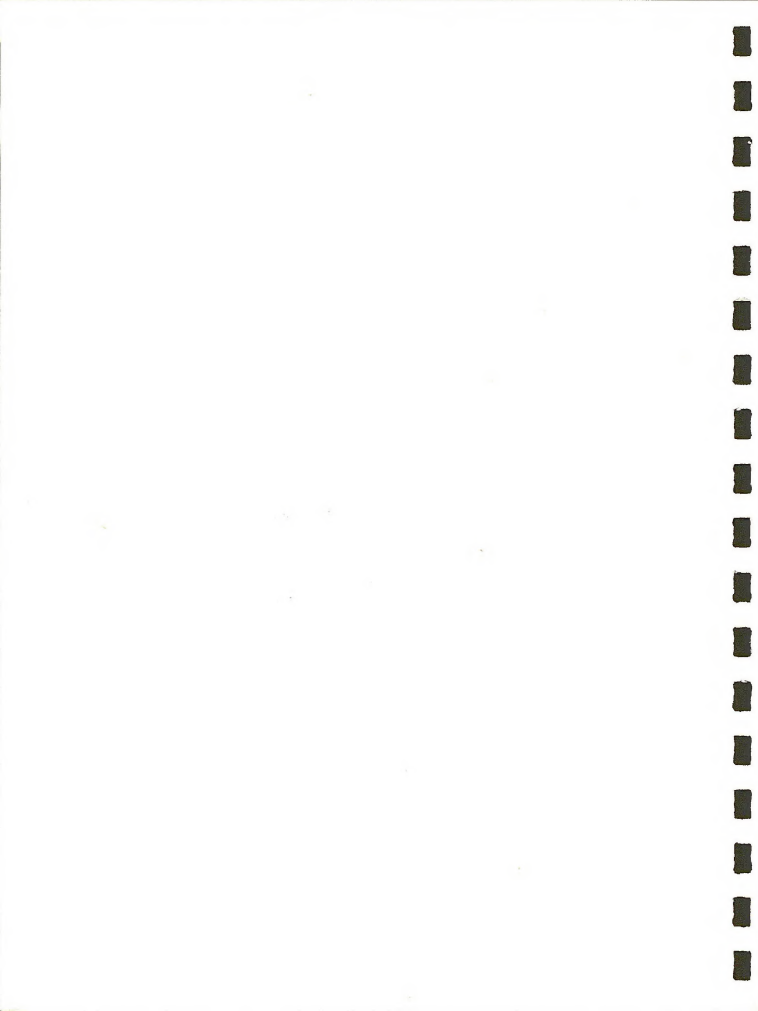
## CHAPTER 7

### IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

#### SOCIOECONOMIC CONDITIONS

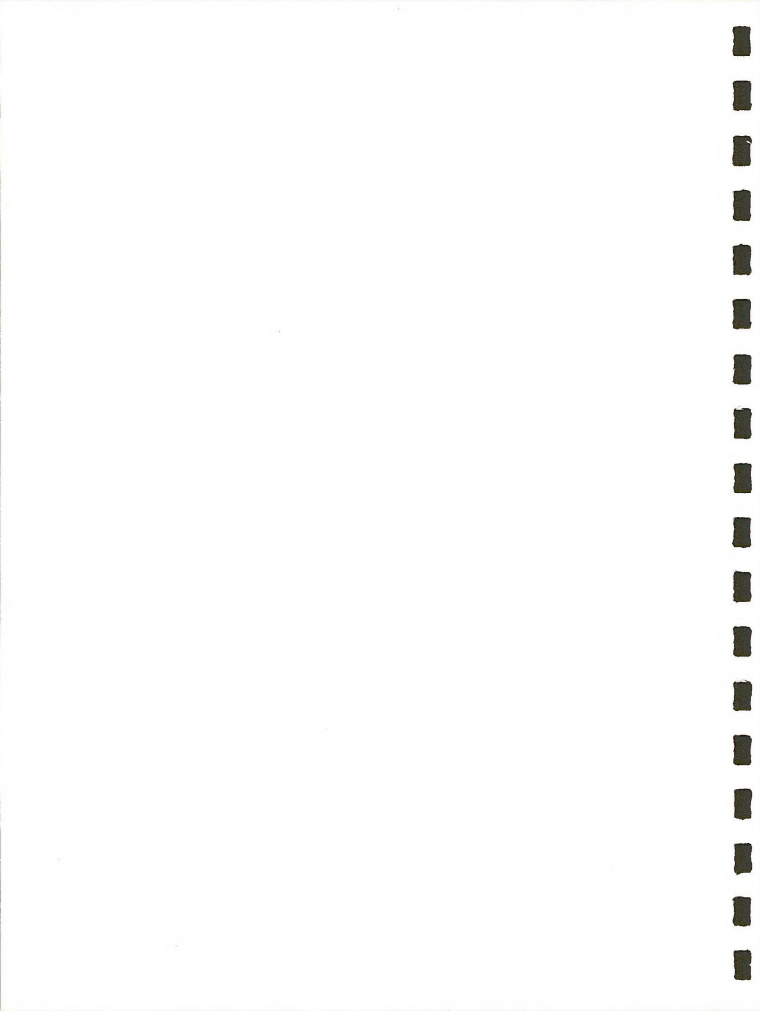
If the proposed coal-related developments on public lands in northwestern New Mexico are approved, the resulting population increases and economic growth would contribute to the irretrievable loss of the small-town atmosphere of communities in the area and the permanent lowering of the quality of life due to increased congestion and air pollution. This increased population and economic growth would only contribute to this loss because, even without the proposed developments, the economy of the ES Region is projected to continue a transformation from a rural society to an industrial one. The proposed developments would also contribute to the irretrievable loss of certain distinctive aspects of the Indian and Hispanic cultures in the area as they confront and adapt an increasingly important Anglo presence in the Region.

The proposed actions would take lands with carrying capacities of more than 2,500 animal unit months (AUM's), depriving ranchers of the income with which they have maintained subsistence and part-time operations in the vicinity of sites. Companies developing and operating coal mines and related facilities would invest more than \$3.2 billion in capital spending and worker payrolls. A projected 30 persons would die in fatal accidents over the design lives of the mines and associated operations. All of these figures -- grazing units, investment dollars and accidental deaths -- represent irreversible and irretrievable commitments to achieve the proposed actions.



CHAPTER 8

ALTERNATIVES TO PROPOSED ACTIONS



## CHAPTER 8

### ALTERNATIVES TO PROPOSED ACTIONS

#### SOCIOECONOMIC CONDITIONS

Social and economic impacts of four alternative sets of actions, including the no action alternative, whose impacts were discussed as the future without the proposed actions in Chapter 2, and the proposed actions, whose impacts were discussed in Chapter 3, are presented in Table 8-1. It should be noted that applicants to the U.S. Bureau of Land Management have already invested large sums in site selection and facility planning. If the no action alternative were selected, their lost investment would exceed \$26.3 million. If the partial action alternative were selected, \$18.5 million in investment would be lost. If the proposed actions were selected, \$8.0 million in selection and planning of elements of the high level scenario would be lost.

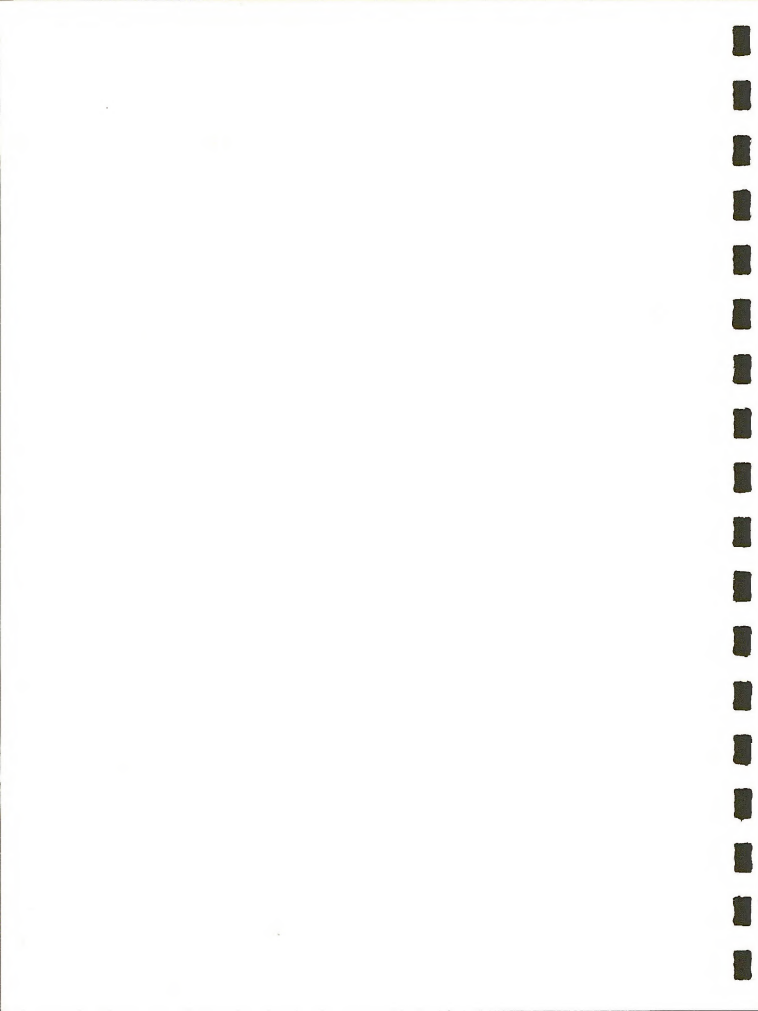




TABLE 8-1

SOCIAL AND ECONOMIC IMPACTS OF ALTERNATIVE ACTIONS, 1980-1990

<u>Indicator</u>	<u>Units</u>	<u>Level</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
1. Total Populations, ES REGION	Persons	No Action Partial Dev. Proposed Action High Level	175,150 177,300 178,950 180,000	195,550 198,200 200,050 204,300	218,150 222,430 224,500 232,000
2. Coal Related Population/Percent of Total Population, ES REGION	Persons/Percent	No Action Partial Development Proposed Action High Level	3,650/2.1 5,850/3.3 7,450/4.2 8,600/4.8	3,250/1.7 5,950/3.0 7,750/3.9 12,100/5.9	4,500/2.1 8,800/4.0 10,800/4.8 18,350/7.9
3. Annual Rate of Population Change, ES REGION	Percent	No Action Partial Development Proposed Action High Level	2.6 3.0 3.3 3.5	2.2 2.3 2.3 2.6	2.2 2.3 2.3 2.6
4. Total Employment, Five-County Area	Persons	No Action Partial Development Proposed Action High Level	76,776 78,772 80,250 81,300	92,227 94,641 96,135 99,949	120,192 115,924 117,570 123,912
5. Direct Coal-Related Employment, Five-County Area Percent of Total Employment which is Direct Coal-Related Employment	Persons/Percent	No Action Partial Development Proposed Action High Level	1,590/2.1 2,600/3.3 3,226/4.0 3,677/4.5	1,344/1.5 2,564/2.7 3,356/3.5 5,227/5.2	1,274/1.1 3,758/3.2 4,630/3.0 8,072/6.5
6. Indirect Coal-Related Employment, Five-County Area Percent of Total Employment which is Coal-Related Indirect	Persons/Percent	No Action Partial Development Proposed Action High Level	1,348/1.8 2,188/2.8 2,932/3.7 3,454/4.2	1,207/1.3 2,234/2.4 2,827/2.9 4,490/4.5	1,1156/1.0 3,387/2.8 4,040/3.4 6,476/5.2
7. Annual Rate of Employment Growth, Five-County Area	Percent	No Action Partial Development Proposed Action High Level	3.4 4.3 4.9 5.4	3.7 3.7 3.7 4.2	5.4 4.1 4.1 4.4

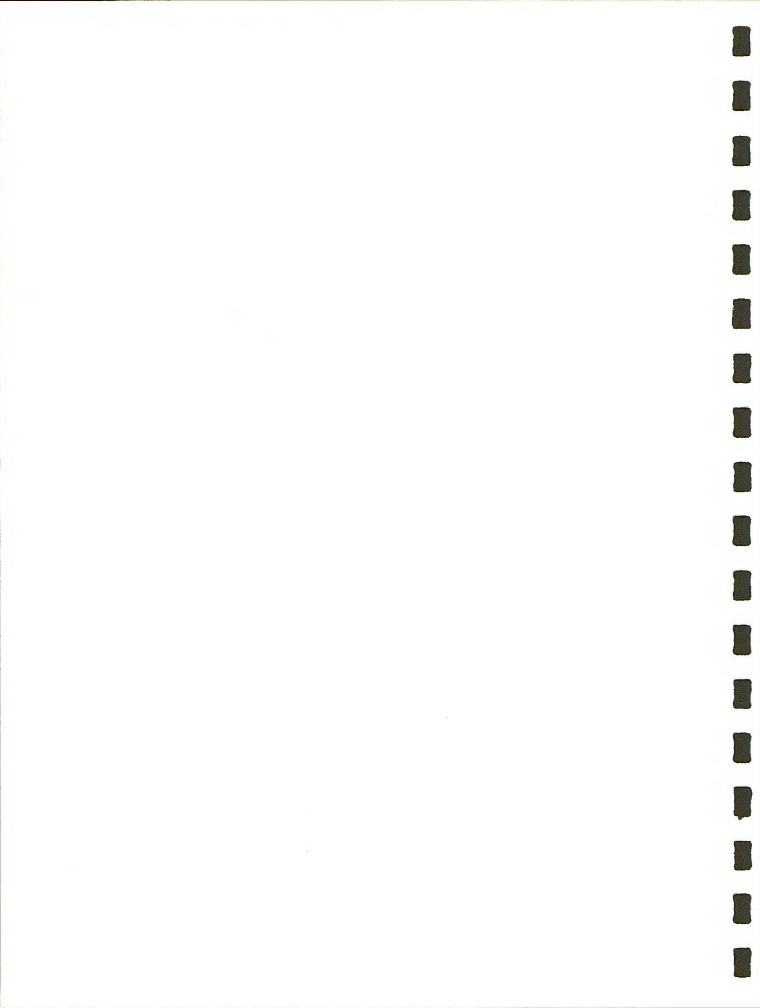


TABLE 8-1

<u>Indicator</u>	<u>Units</u>	<u>Level</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
8. Total Personal Income Five County Area/Percent of which is Coal-Related	Thousands of Dollars/Percent	No Action	650,746/7.4	826,588/5.1	1,050,595/3.8
		Partial Development	680,940/11.5	863,706/9.1	1,128,075/10.4
		Proposed Action	748,798/16.5	929,227/13.0	1,193,120/14.1
		High Level	763,824/19.0	986,033/20.2	1,290,691/23.7
9. Increased Motor Vehicle Registrations ES REGION/Percent of Total Which is Coal-Related (1977 Baseline)	Vehicles/Percent	No Action	104,073/3.9	117,285/3.0	131,350/3.8
		Partial Development	160,493/4.0	120,255/5.4	136,080/7.1
		Proposed Action	108,253/7.6	122,235/7.0	138,280/8.6
		High Level	109,518/8.6	127,020/10.5	146,585/13.8
10. Additional Units of Housing ES REGION/Percent of Total Which is Coal-Related (1977 Baseline)	Dwelling Units/Percent	No Action	45,694/3.0	51,058/2.3	63,371/1.7
		Partial Development	46,790/5.3	52,321/4.6	65,907/5.5
		Proposed Action	47,220/6.1	55,750/5.1	66,285/6.1
		High Level	47,676/7.0	54,389/8.3	68,989/10.8
11. Additional Mobile Homes/ES REGION/Percent of Total Which is Coal-Related (1977 Baseline)	Mobile Homes/Percent	No Action	12,763/8.5	14,733/6.3	20,130/4.5
		Partial Development	13,640/14.4	15,744/12.3	22,159/13.1
		Proposed Action	13,984/16.5	16,087/14.2	22,461/14.3
		High Level	14,348/18.7	17,398/20.7	24,624/21.8
12. School Age Population ES REGION/Percent of Total Which is Coal-Related	Students/Percent	No Action	43,787/2.1	48,888/1.7	54,538/2.1
		Partial Development	44,325/3.3	49,550/3.0	55,608/4.0
		Proposed Action	44,738/4.2	50,013/3.9	56,125/4.8
		High Level	45,000/4.8	51,075/5.9	58,000/7.9
13. Increased Teachers/Classrooms Needed ES REGION/Percent of Total Which is Coal-Related (1977 Baseline)	Teachers/Percent	No Action	2,085/2.1	2,328/1.9	2,597/2.6
		Partial Development	2,111/3.4	2,360/3.4	2,648/5.0
		Proposed Action	2,130/4.3	2,382/4.4	2,673/6.2
		High Level	2,143/4.9	2,432/6.9	2,762/10.5
14. Increased Health Care Personnel (Doctors) Needed ES REGION/Percent of Which is Coal-Related (1977 Baseline)	Professionals/Percent	No Action	283/2.1	315/1.6	352/2.0
		Partial Development	286/3.1	320/3.1	359/4.0
		Proposed Action	289/4.2	323/4.0	362/4.7
		High Level	290/4.8	330/6.1	374/8.0

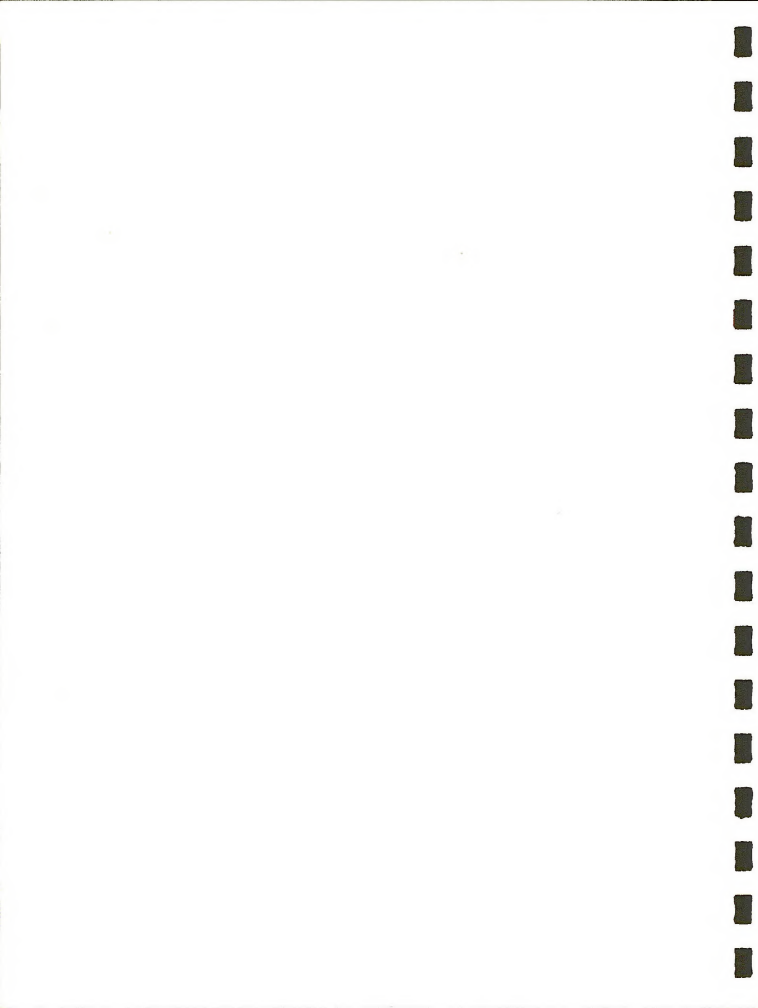


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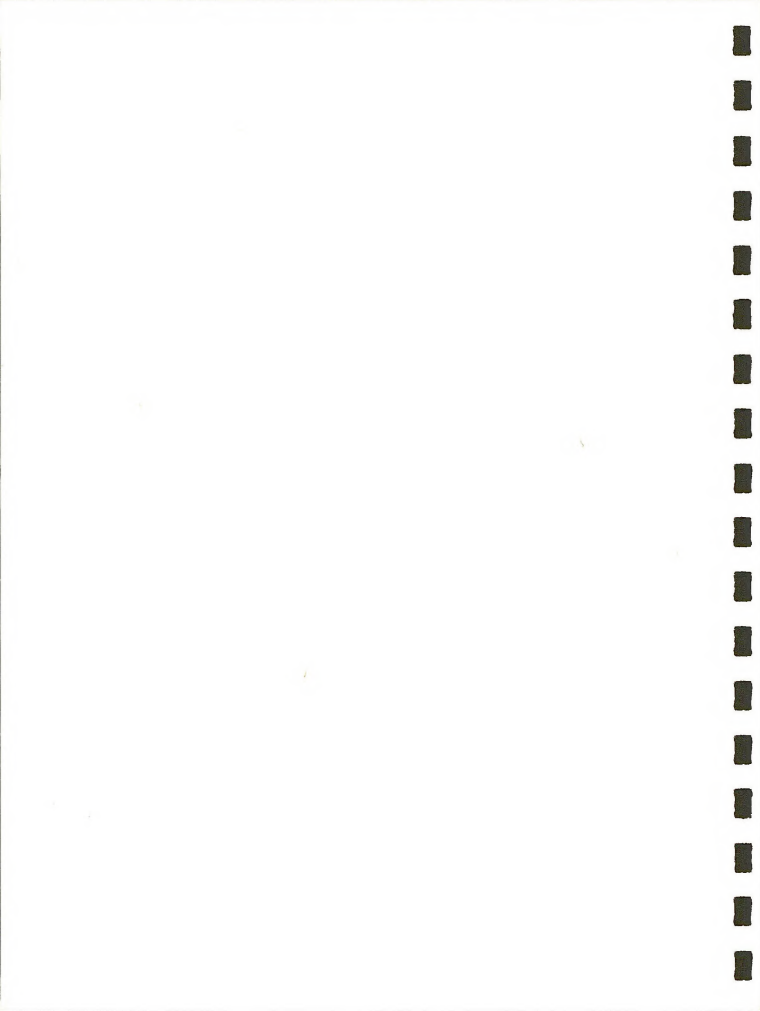
<u>Indicator</u>	<u>Units</u>	<u>Level</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
15. Increased Hospital Beds Needed ES REGION/Percent of Which is Coal-Related (1977 Baseline)	Beds/Percent	No Action Partial Development Proposed Action High Level	701/2.1 709/3.2 716/4.2 720/4.7	782/1.7 793/3.0 800/3.9 817/5.9	873/2.1 890/3.9 898/4.8 928/7.9
16. Increased Law Enforcement Personnel Needed ES REGION/ Percent of which is Coal- Related (1977 Baseline)	Law Officers/ Percent	No Action Partial Development Proposed Action High Level	350/2.0 355/3.4 358/4.2 360/4.7	391/1.8 396/3.0 400/4.0 409/5.9	436/2.1 445/4.0 449/4.9 464/8.0
17. Increased Fire Protection Personnel Needed, ES REGION/ Percent of Which is Coal- Related (1977 Baseline)	Firemen/Percent	No Action Partial Development Proposed Action High Level	313/2.2 317/3.2 320/4.0 321/4.7	349/1.7 354/3.1 357/3.9 365/6.0	390/2.1 397/4.0 401/4.7 414/8.0
18. Community Water Use, ES REGION/ Percent Which is Coal-Related (1977 Baseline)	Thousand-gallons/ day/percent	No Action Partial Action Proposed Action High Level	22,502/2.7 22,866/4.4 23,130/5.6 23,319/6.5	27,936/2.0 28,381/3.6 28,678/4.7 29,396/7.3	35,021/2.2 35,730/4.2 36,060/5.2 37,306/8.8
19. Wastewater Treatment Needs ES REGION/Percent Which is Coal-Related	Thousand-gallons/ day/percent	No Action Partial Action Proposed Action High Level	7,493/2.7 7,614.4.4 7,702/5.6 7,765/6.5	9,303/2.0 9,450/3.6 9,550/9.7 9,789/7.3	11,566/2.2 11,800/4.2 11,900/5.2 12,423/8.8
20. Coal-Related Local Government Property Tax Revenues in ES REGION	Millions of Dollars	No Action Partial Action Proposed Action High Level	1.7 2.0 2.6 3.3	1.7 2.4 2.7 7.9	1.8 3.1 5.6 10.5
21. Coal-Related Local Government Gross Receipts Taxes in ES REGION Revenues	Millions of Dollars	No Action Partial Action Proposed Action High Level	0.1 0.2 0.3 0.3	0.1 0.2 0.3 0.4	0.2 0.3 0.4 0.6



TABLE 8-1

<u>Indicator</u>	<u>Units</u>	<u>Level</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
22. Increase in Total Local Government Revenues, ES REGION	Millions of Dollars	No Action	1.8	1.8	2.0
		Partial Development	2.2	2.6	3.4
		Proposed Action	2.9	3.0	6.0
		High Level	3.6	8.3	11.1
23. Increase in Total Local Government Expenditures	Millions of Dollars	No Action	7.2	0.6	1.5
		Partial Development	11.1	0.7	2.7
		Proposed Action	14.0	0.8	3.0
		High Level	16.1	3.1	5.1
24. Impact on Balances of Local Government Budgets	Millions of Dollars	No Action	(5.4)	1.2	0.5
		Partial Development	(8.9)	1.9	0.7
		Proposed Action	(11.1)	2.2	3.0
		High Level	(12.5)	5.2	6.0
25. Increase in State Severance Taxes	Millions of Dollars	No Action	1.4	1.5	1.4
		Partial Development	1.4	1.9	2.3
		Proposed Action	1.8	4.2	4.7
		High Level	2.1	7.0	9.1
26. Impact on Balances of Local Government Budgets with State Severance Taxes	Millions of Dollars	No Action	(4.0)	2.7	1.9
		Partial Development	(7.5)	3.8	3.0
		Proposed Action	(9.3)	6.4	7.7
		High Level	(10.4)	12.2	15.1





SITE-SPECIFIC ANALYSES

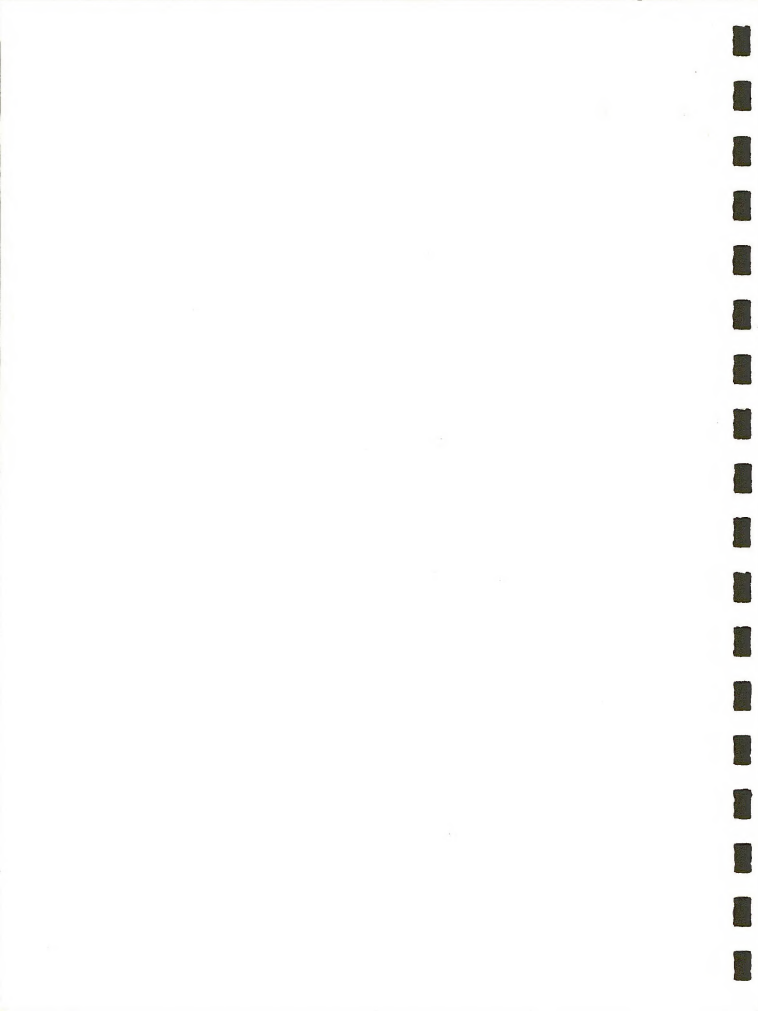
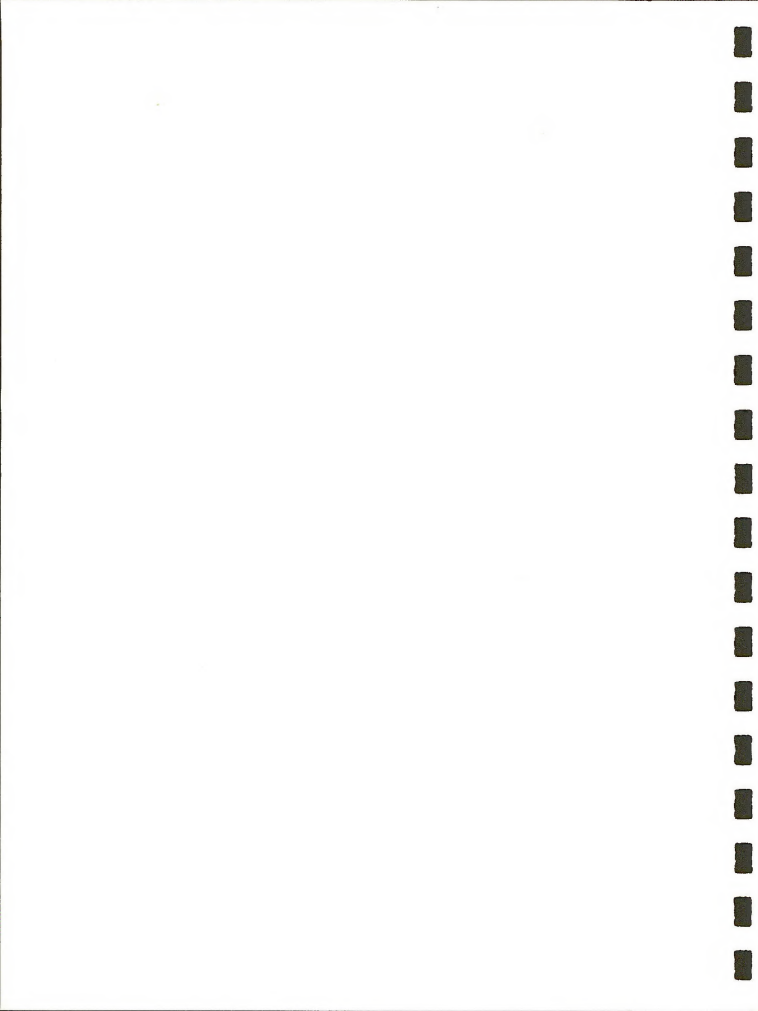


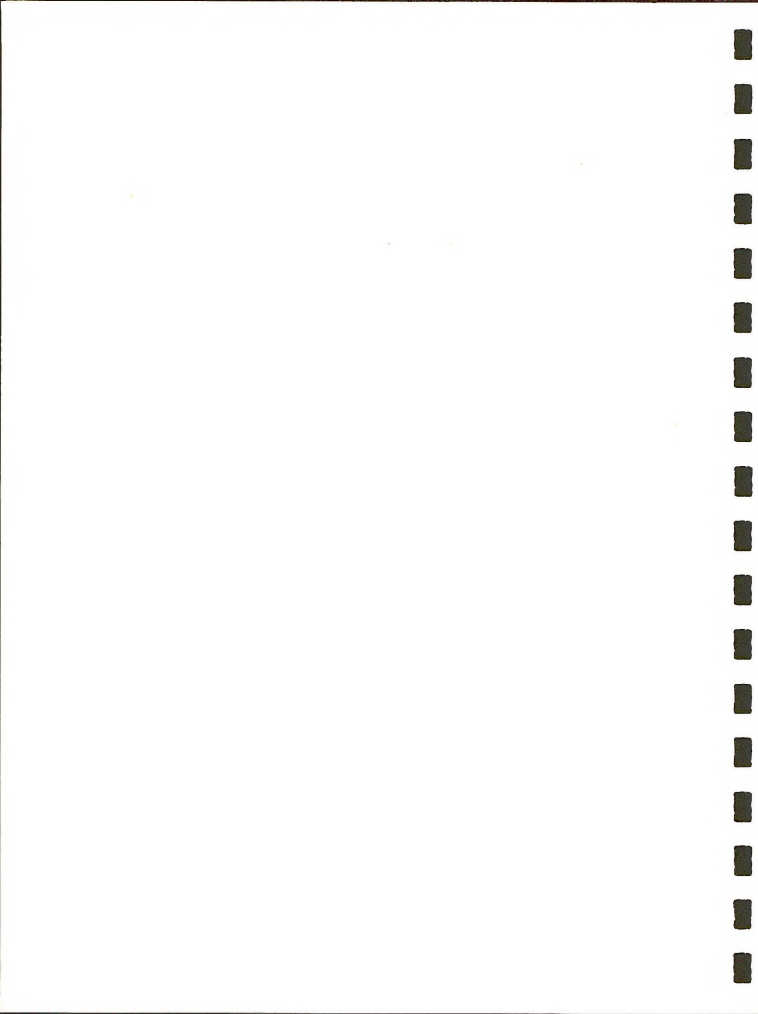
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SITE SPECIFIC ANALYSIS:

AMCOAL MINE EXPANSION



## CHAPTER 2

### DESCRIPTION OF THE ENVIRONMENT

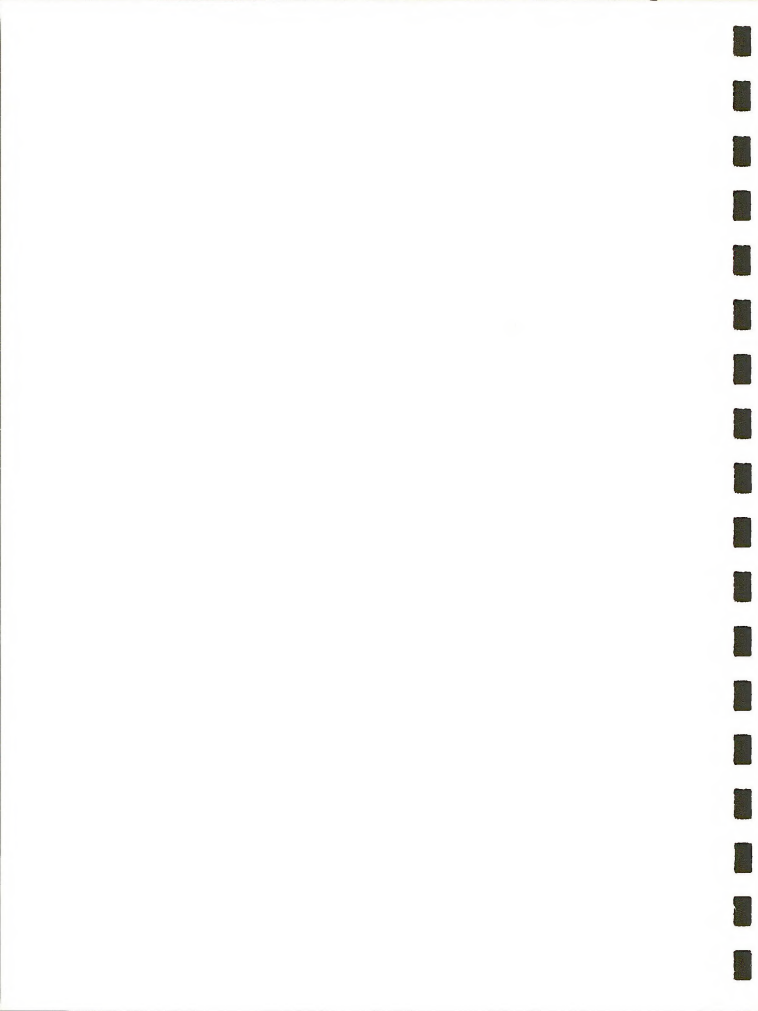
#### SOCIOECONOMIC CONDITIONS

Surface coal mining proposed by the Amcoal Company would be located 12 miles southeast of Gallup in McKinley County, where mining operations are currently underway. Gallup, the county seat, is populated by over 17,500 residents and represents the major social, cultural and transportation center in the region. Gallup offers scheduled air service, and is served by passenger and freight rail lines (Atchison, Topeka and Santa Fe), which link the area to Albuquerque and Flagstaff. The Fort Wingate Army Depot lies 1.1 miles to the east of the Amcoal site.

Interstate Highway 40 is a major route through the region, joining Flagstaff, Arizona, to the west with Gallup, Albuquerque and other points east. The primary assessment region has been defined to encompass Gallup and the surrounding area.

Refer to Chapter 2 of the Regional Analysis for an extensive description of infrastructural conditions of the existing environment.





## CHAPTER 3

### ASSESSMENT OF IMPACTS

#### SOCIOECONOMIC CONDITIONS

In general, the social and economic impacts of the proposed expansion of the Amcoal, Inc. mine are negligible. The mine is already in operation on private and Indian land. Hence, many of the effects of starting up the mine have already been felt. The most significant aspects of the action under consideration for the communities and the economy of McKinley County, in which the Amcoal mine is located, are associated with new hiring and additional income generated by the extension, and by other facets of the expanded operation. However, most of these are relatively minor in the context of the rapid population and economic growth projected for the county in the next quarter-century. For the less than 10 persons now living on the lands to be taken in the expansion, however, the operation would have a major and immediate impact. Moreover, for present employees of the mine, extension of its operating life means the preservation of jobs and income.

There would be no identifiable direct or indirect population impacts associated with the proposed action, given the small-scale expenditures and hiring associated with proposed actions. The total number of jobs directly and indirectly dependent on the mine would be approximately 80, with contributions to total personal income estimated at more than \$2.0 million annually. Extension of the Amcoal mine near Gallup would result in minor impacts to area roadways, as described in Table 3-1. All impacts on housing demand stemming from the mine extension would occur in the vicinity of Gallup. Impacts would not be significant and would involve at most one more housing unit. Revenues generated by the mines through severance and property taxes would be relatively small, due to light production levels. Severance taxes would not exceed \$200,000 a year, while property taxes would fall below \$40,000 annually.

Refer to the Regional Analysis for a discussion of cumulative effects on social and cultural development from planned resource development. The proposal by Amcoal would itself be too small to have identifiable, specific impacts on McKinley County in the ES Region.

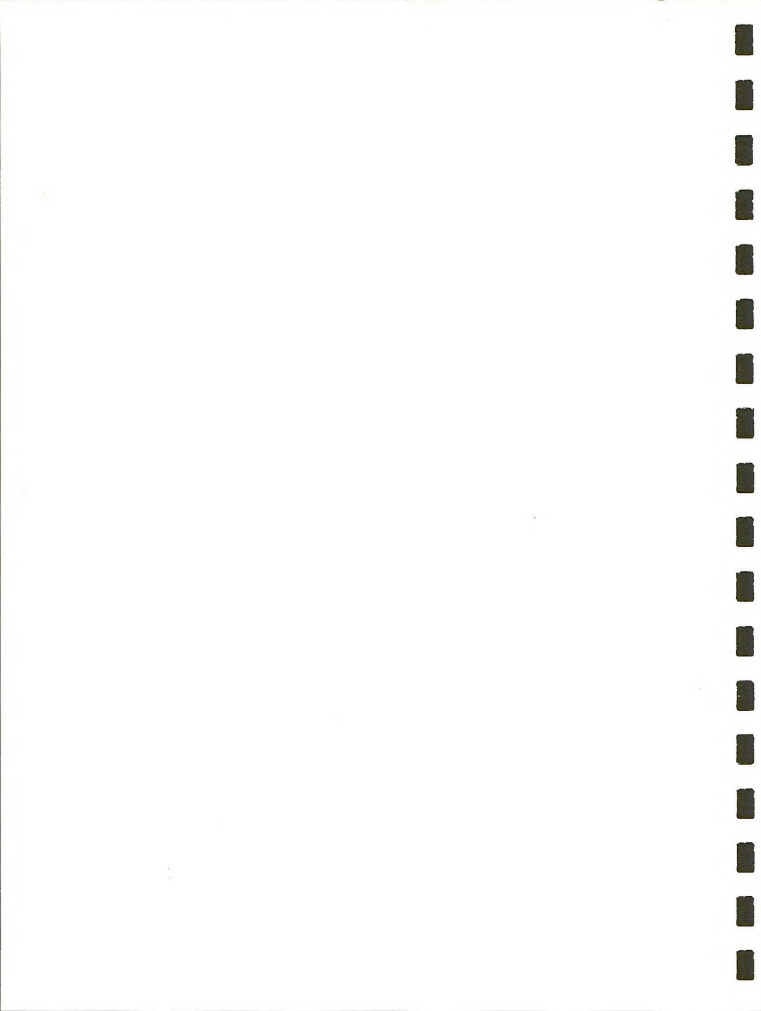


TABLE 3-1

AMCOAL MINE EXTENSION: HIGHWAY IMPACTS

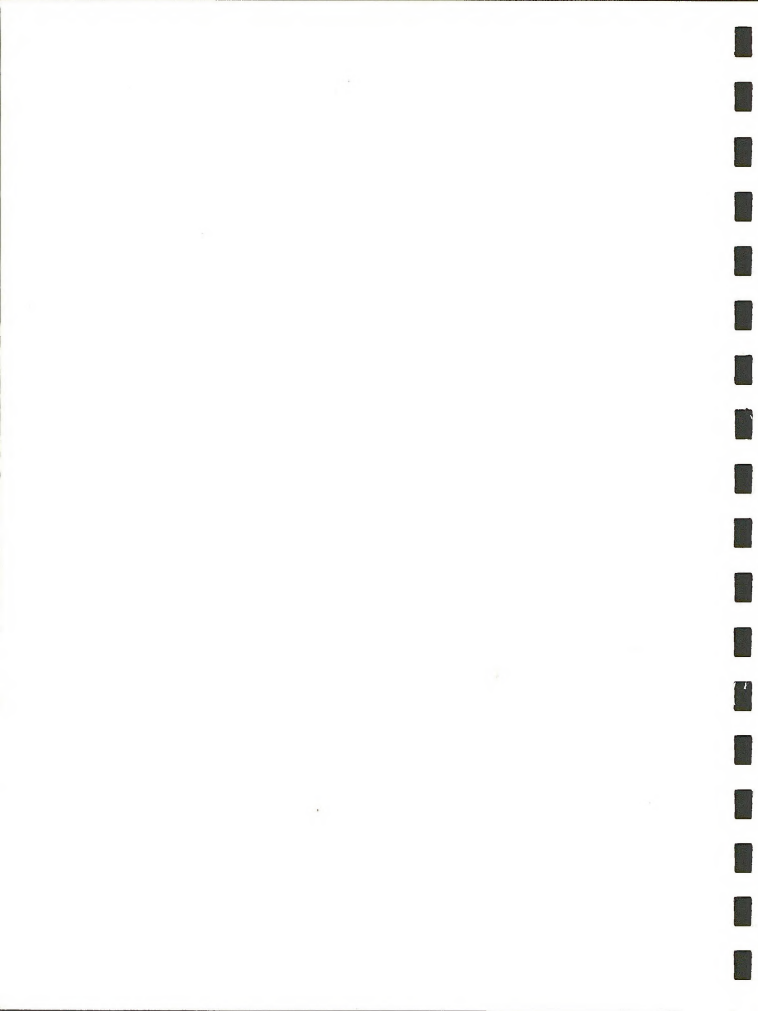
<u>Road Designation</u>	<u>Average Rating</u>	<u>Description of Impact</u>	<u>Significance</u>
Interstate Highway 40	21 miles: 82.7	Indirect impact of acceleration required maintenance due to increased commuter traffic east and west of the site.	Minimal
Sundance Coal Mine Road	Not rated	Direct impact of company self-maintenance of dedicated county road representing access to mine site.	Uncertain

Source: New Mexico State Department of Highways, 1977.



SITE SPECIFIC ANALYSIS:

CHACO ENERGY COMPANY STAR LAKE MINE



## CHAPTER 2

### DESCRIPTION OF THE ENVIRONMENT

#### SOCIOECONOMIC CONDITIONS

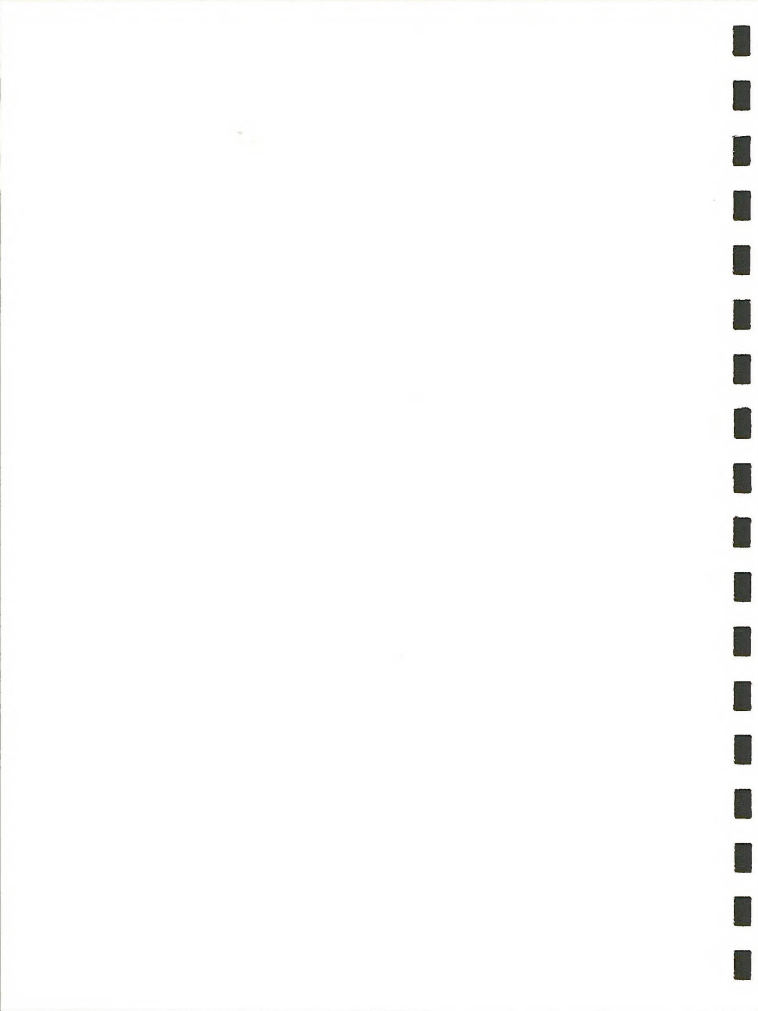
A surface coal mine proposed by the Chaco Energy Company (Chaco) would be located in a sparsely populated district approximately 25 miles southeast of Nageezi and 45 miles southwest of Cuba, in McKinley County. The Star Lake area is situated 75 miles from the incorporated San Juan River Valley communities of Farmington, Aztec and Bloomfield. With combined populations of about 40,000, these cities provide a major trade center for the northwestern New Mexico region. To the west in McKinley County lies the unincorporated town of Crownpoint, the only major community in that county located west of the Continental Divide and east of the Navajo Indian Reservation. To the northeast of the proposed mining site is the village of Cuba, the largest community in the western portions of the Sandoval County.

The Star Lake Mine site is serviced by Navajo Route 47, an unimproved road which provides access to the site through links with Navajo Routes 46 and 47a and thereby New Mexico Highways 44 and 197, and Navajo Route 9. With the exception of the last three highways, none of these roads possesses an all-weather surface and all are often impassible.

The primary ES region has been defined to encompass San Juan County, including Aztec, Farmington and Bloomfield, northern McKinley County, primarily in the vicinity of Crownpoint, and the western portion of Sandoval County around the village of Cuba.

Refer to Chapter 2 of the Regional Analysis for an extensive description of infrastructural conditions of the existing environment.





## CHAPTER 3

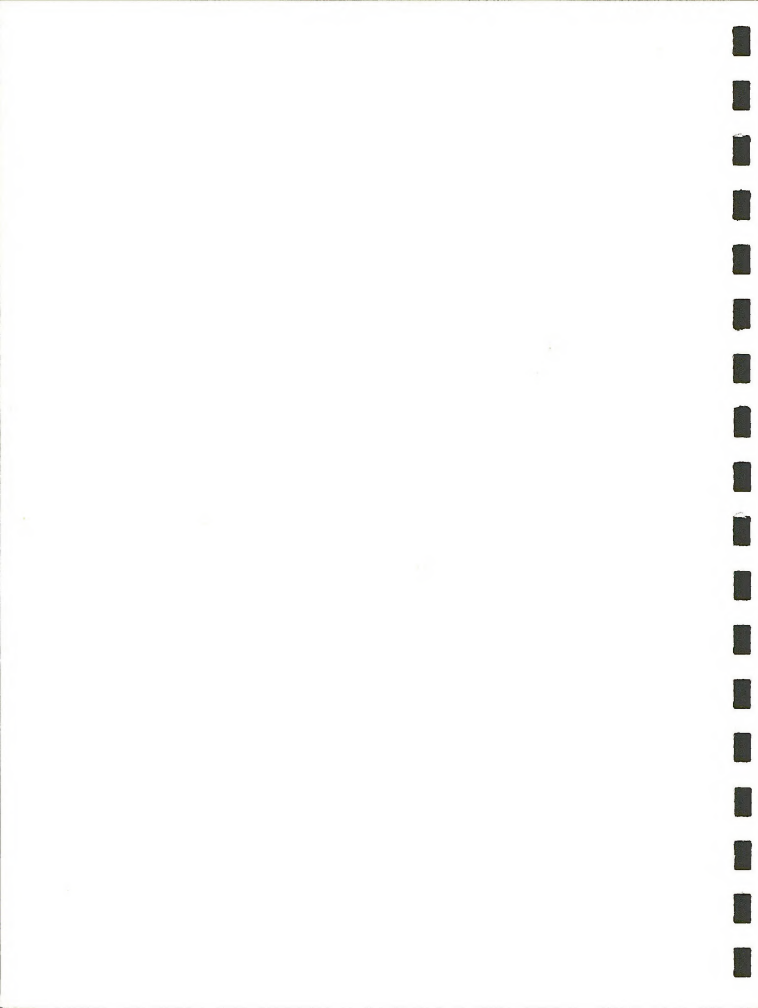
### ASSESSMENT OF IMPACTS

#### SOCIOECONOMIC CONDITIONS

##### DEMOGRAPHIC FEATURES

The proposed Chaco Energy Company mining operation at Star Lake would ultimately increase the populations of McKinley, San Juan, and Sandoval Counties by approximately 860 persons. This increase in the total number of the region's inhabitants would result partly from the migration into the area of workers and their families in response to job opportunities created at the mine, although some of those hired would already be local residents. It would also reflect indirect employment impacts from the proposed action, as capital outlays and payroll spending by Chaco Energy Company combined to increase regional economic activity, generate 450 additional jobs in all sectors, and attract still more migrants to northwestern New Mexico. In the period of mine development, 1979-1983, a maximum temporary population increase of more than 450 persons would be associated with expenditures and employment required to set up operations and install facilities and equipment. With the beginning of coal mining operations, permanent increases in the population of McKinley, San Juan, and Sandoval Counties would result. By 1985, additional inhabitants of the three counties would equal 860, with no further expansion at the mine projected for 1990 and hence no additional impacts. The one person who would have to be relocated from the mine site has already done so and is residing in the vicinity. For a discussion of impacts of relocation on legal residents and unauthorized occupants, see Chapter 2 of the Regional Analysis.

No impacts would occur before mine development begins in 1979. During the construction of Chaco's facilities at Star Lake, a thousand transient migrants to the area would result from labor requirements of building crews at the site. As many as 456 persons might move to the vicinity of the proposed mine at this time, but their stays would be temporary and they would add less than 0.5 percent to population in the three county area. In 1990 impacts would equal 860 persons, a relative increase of 0.5 percent over projected base populations. These



would accelerate the relative growth in the number of the region's urban inhabitants, and diminish the relative size of rural populations. In addition, most of that increment would be likely to consist of White, Anglo migrants to the three counties. Hence, the project would have the effect of further increasing the relative number of English-speaking residents of McKinley, San Juan, and Sandoval Counties, while causing the percent of the total represented by Hispanos and Indians to drop. The opening of the new Star Lake Mine would augment the numbers of one element -- urban, Anglo residents -- and in so doing cause a relative diminution in numbers of all others.

#### ECONOMIC CHARACTERISTICS

The Star Lake Mine proposed by the Chaco Energy Company would directly add 240 permanent jobs to the employment of McKinley County and increase the income of the county residents, as shown in Table 3-1. Parts of San Juan and Sandoval Counties could also be expected to benefit, but the mine itself would be located in the northeastern corner of McKinley County and hence its payrolls would be reported with employment figures for that county. Chaco does not expect to fill many of the positions at the mine with personnel from its parent company, Texas Utilities; these persons would assume staff and supervisory roles. Other positions at the mine would be supplied by the labor pool existing in New Mexico at the time of need. Construction of the mine is now projected to require a maximum of 367 workers at one time, during the period 1979-1983. The production of coal would begin even before all phases of facility development were complete. In 1990, operational personnel requirements would equal 240 persons. Unlike the construction work force, these employees would be permanent and full-time. The labor needs of the Star Lake Mine are not projected to change after the initial six years of development operation.

In addition to the direct employment impacts of the proposed action, indirect employment impacts on the area would result from capital outlays and payroll spending associated with the mine. These expenditures would combine to increase regional economic activity and to generate more jobs in all sectors. During mine development, this multiplier effect of expenditures and hiring by Chaco and its contractors would equal 1.327 new jobs for each new employee listed directly on the company's and the contractor's payrolls. In 1979-1983, therefore, as many as 487

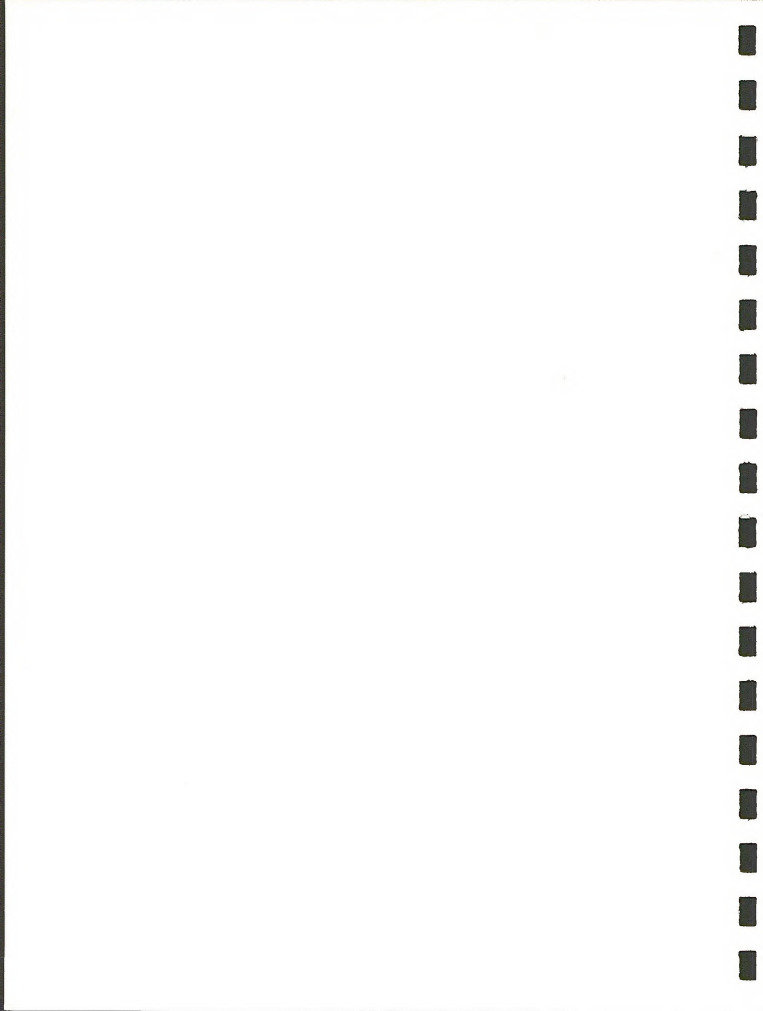


TABLE 3-1

CHACO ENERGY COMPANY STAR LAKE MINE: DIRECT AND INDIRECT EMPLOYMENT,1980 - 1990

<u>Type of Employment</u>	<u>1980 Number of Jobs</u>	<u>Percent Increase With Proposed Actions</u>	<u>1985 Number of Jobs</u>	<u>Percent Increase With Proposed Actions</u>	<u>1990 Number of Jobs</u>	<u>Percent Increase With Proposed Actions</u>
TOTAL	450	0.7	450	0.4	450	0.4
INDIRECT	304	0.4	210	0.2	210	0.2
DIRECT	229	0.3	240	0.2	240	0.2

Source: Harbridge House, Inc. 1978.

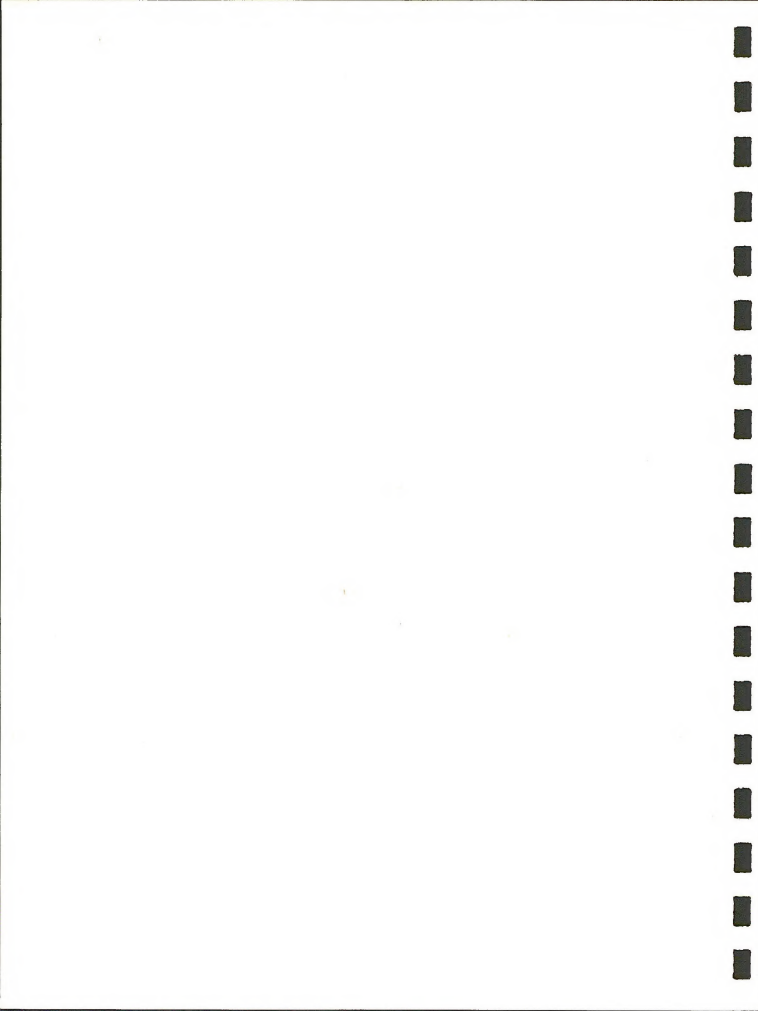


additions to the local number of inhabitants would be permanent, associated with the continuing operation of the Star Lake Mine. Figures after 1984 would be no different from those for 1990 because mine production is projected to remain constant. Thus the impact of the proposed action on the region's population is projected to consist of 810 inhabitants living in McKinley, San Juan, and Sandoval Counties between 1984 and the closing of the mine. Of this total, 108 are expected to be located in eastern McKinley County (in the vicinity of Crownpoint), 322 to live in San Juan County (primarily the Aztec-Bloomfield-Farmington area), and 430 to be residents of western Sandoval County (Cuba and its environs). The community of Crownpoint is assumed to receive all of the population increase attributed to McKinley County. Because Crownpoint is comparatively small, impacts would be relatively larger than for cities like Aztec and Farmington. In addition to the incorporated municipalities, a large percentage of the impact population in San Juan County -- approximately 25 percent -- would be likely to settle in unincorporated areas around the towns and along New Mexico Highway 44, leading south and east toward the site of the proposed action.

Cuba, in Sandoval County, might be the community most affected by the Star Lake Mine. Although Chaco is also considering Pueblo Pintado and other alternatives, it might settle upon Cuba as the town it would seek to develop in relation to its proposed Star Lake Mine. The company is weighing the guarantee of land subdivision sales in order to put small property lots suitable for homebuilding on the local market. Likewise, it is evaluating the possibility of itself building or contributing to an improved roadway between Cuba and its mines, and of starting a commuter bus system for workers. While such plans remain in the conceptual stage, they suggest that Cuba might bear the brunt of the social and economic impacts of the proposed action.

The additional population caused by development and operation of the Star Lake Mine would contribute to shifts in the demographic characteristics of McKinley, San Juan, and Sandoval Counties, not constitute their sole cause. The proposed action would further advance several recent trends. Most of the migrants attracted to the counties by the mining project would become residents of incorporated, and adjacent unincorporated, urban areas. The increment to the total population added by the mine





jobs would be created indirectly as a result of mine development, but these gains would be a temporary phenomenon of construction-phase hiring and spending. During mine operation, .877 persons would gain employment for each direct hire at the Star Lake Mine. By 1985, with the end of the construction activity, the number of jobs created indirectly by the proposed action would equal 210. These positions would constitute a permanent addition to local payrolls associated with continued operation of the planned resource development. Table 3-1 contrasts anticipated impacts with levels of employment projected for the three affected counties in the absence of the proposed action.

The payroll afforded by the operations of the Star Lake Mine would ultimately exceed \$3.4 million (at 1977 dollar values and wage rates), adding percent to total personal income in the three counties. Direct effects on total income would result from average wages at the mine which are expected to approximate at least \$15,500 a year in 1977 dollars. This is well above the present averages for McKinley, San Juan, and Sandoval Counties, which remain below \$10,000 annually. Although jobs created indirectly by the proposed action would probably conform to general patterns of compensation, the development and operation of the mine would have the effect of creating a disproportionately large number of high-paying jobs primarily in the construction and mining sectors. Thus, the Star Lake Mine would contribute to economic pressures pushing the average wage level in the region up and not only add to total personal income, but to per capita income as well. The mine would also add to pressures on labor turnover, and hence to rising costs in the region. However, the influence of the proposed actions would be relatively small, given the projected growth of the regional economy. The cumulative effects of all proposed resource developments, of course, would be much greater.

With the addition of more residents and more workers, the proposed action would affect the infrastructure of communities surrounding the mine site. These impacts are represented in Tables 3-2 and 3-3.

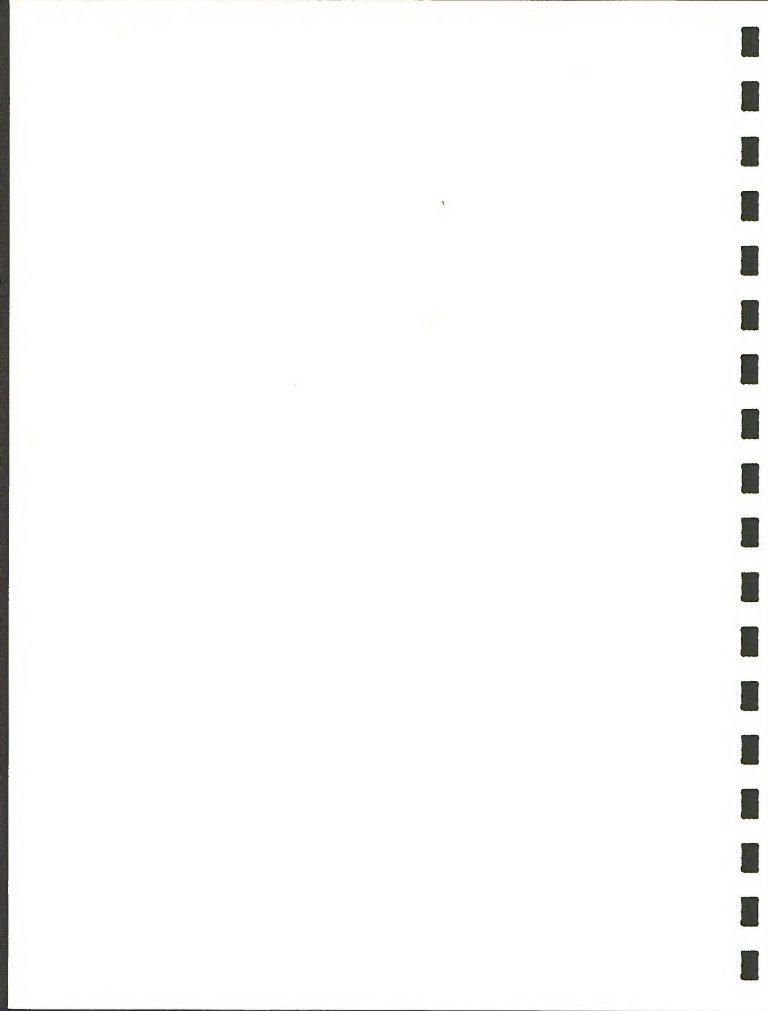


TABLE 3-2

STAR LAKE MINE: HIGHWAY IMPACTS

<u>Road Designation</u>	<u>Average Rating<sup>a</sup></u>	<u>Description of Impact</u>	<u>Estimated Cost</u>
Navajo Route 47	Not rated	Direct impact of grading, draining and surfacing to provide access to site.	\$2.7 million
Navajo Route 47A	Not rated	Direct impact of grading draining and surfacing to improve access to site.	\$3 million
Navajo Route 46	Not rated	Contributes to direct impact with Star Lake Railroad of grading, draining and surfacing to improve access to site.	\$2.5 million <sup>b</sup>
N.M. 197	16 miles: 66	Indirect impact of acceleration of required improvements due to commuter traffic from Sandoval County.	None
N.M. 44	33 miles: 47.5	Indirect impact of acceleration of required improvements due to commuter traffic from San Juan River Valley communities.	None

Notes: <sup>a</sup>New Mexico State Department of Highways Condition Rating for appropriate roads and portions thereof affected by proposed action, a rating of 74 or less indicating deficient condition. (See Regional Analysis Appendix A for description of rating method; refer to Map II-6, Regional Analysis, for route locations.)

<sup>b</sup>One-half of estimated total cost.

Source: New Mexico State Department of Highways, 1977.

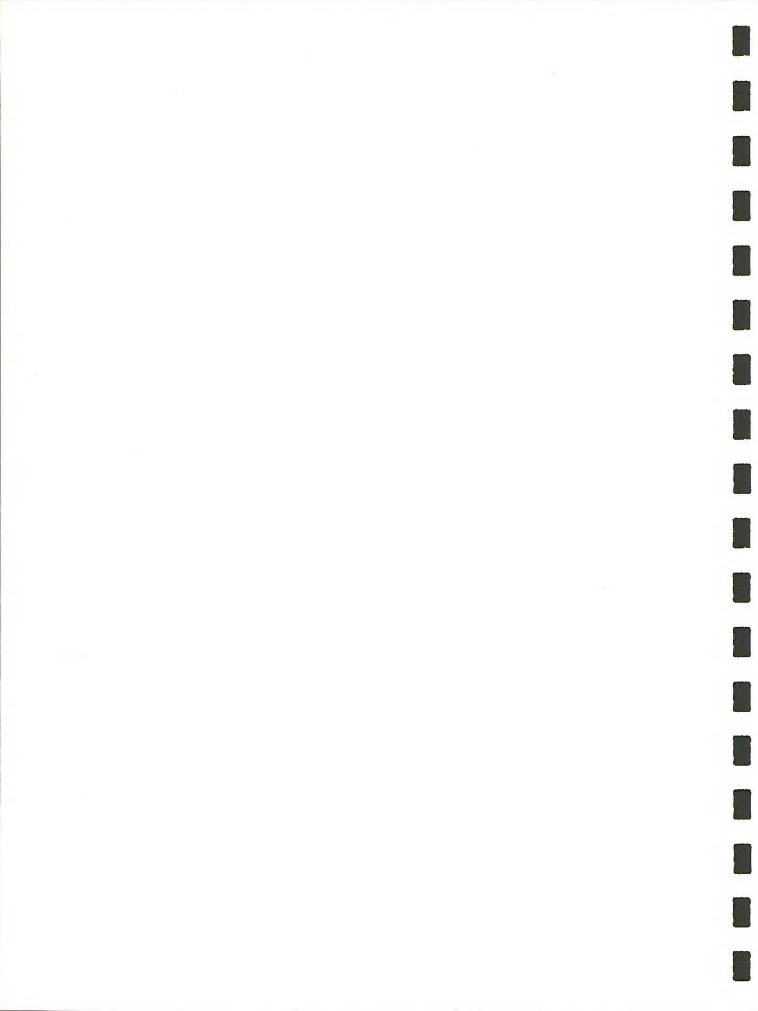


TABLE 3-3

CHACO ENERGY COMPANY STAR LAKE MINE: COMMUNITY FACILITIES AND SERVICES,  
1980-1990

<u>Community Facility or Service</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
HOUSING UNITS			
Additional Unit Needed with Proposed Action	251	224	224
Percent of Total Without Proposed Action	0.5	0.4	0.4
EDUCATIONAL SYSTEMS			
Additional Teachers Needed with Proposed Action	5	7	7
Percent of Total Without Proposed Action	0.2	0.3	0.2
HEALTH CARE SYSTEMS			
Additional Doctors Needed with Proposed Action	1	1	1
Percent of Total Without Proposed Action	0.1	0.1	0.1
POLICE PROTECTION			
Additional Policemen Needed with Proposed Action	1	1	1
Percent of Total Without Proposed Action	0.1	0.1	0.1
FIRE PROTECTION			
Additional Firemen Needed with Proposed Action	1	1	1
Percent of Total Without Proposed Action	0.1	0.1	0.1

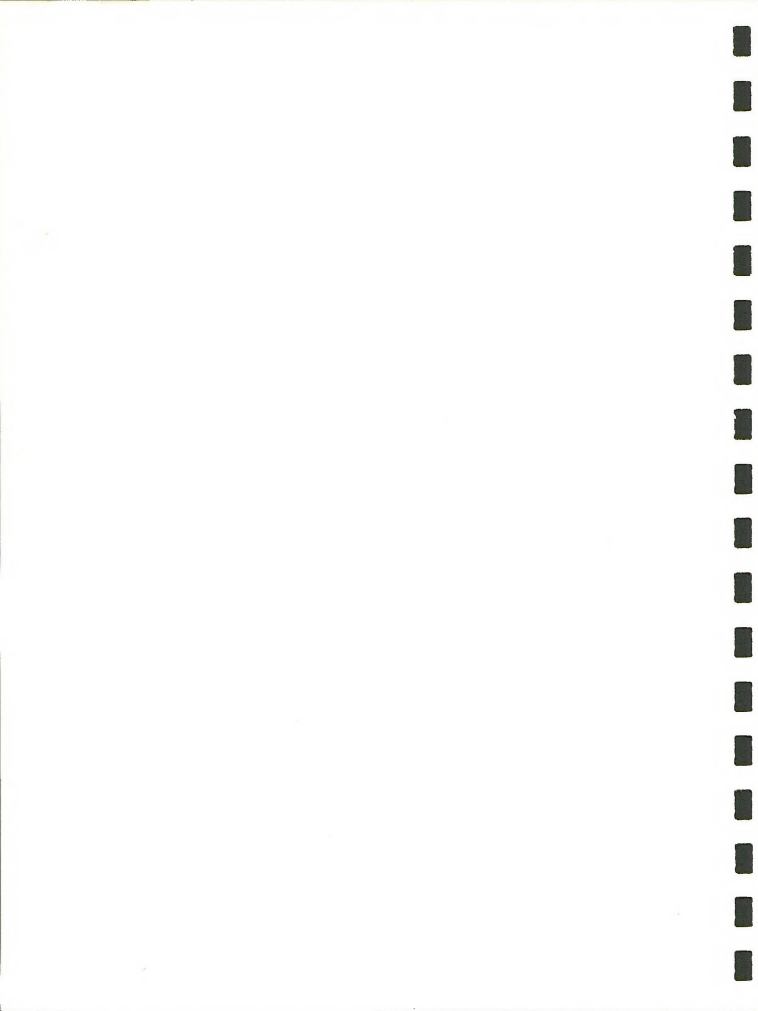
Source: Harbridge House, Inc. 1978



SITE SPECIFIC ANALYSIS:

FRUITLAND COAL LOAD





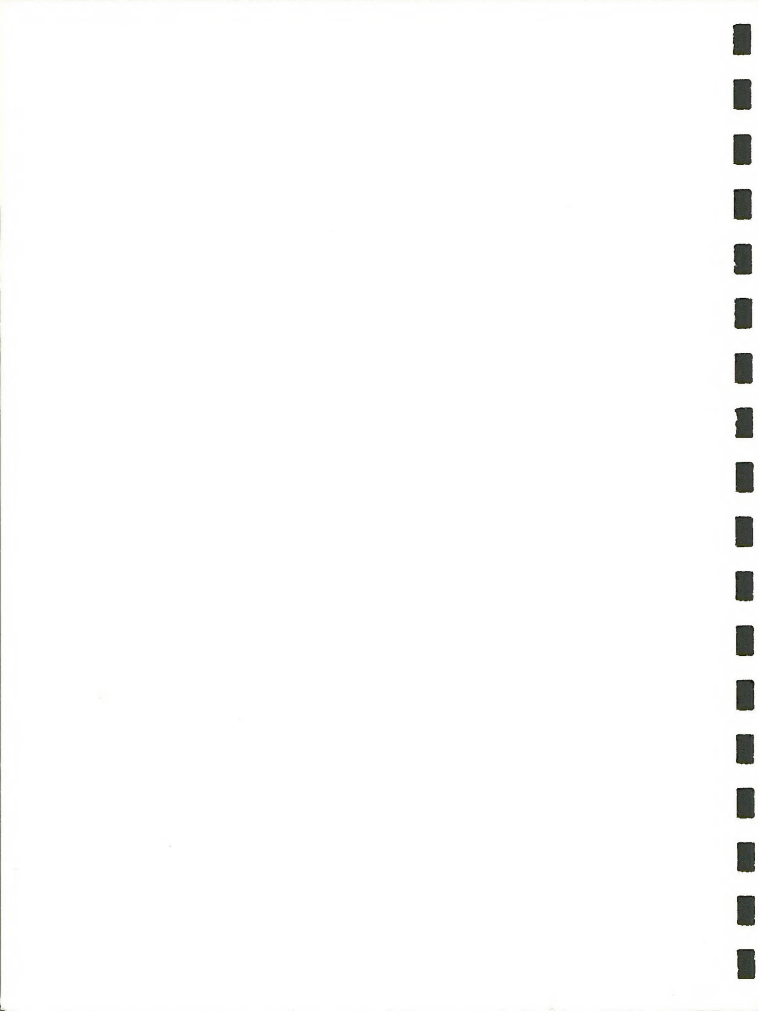
## CHAPTER 2

### DESCRIPTION OF THE ENVIRONMENT

#### SOCIOECONOMIC CONDITIONS

A 230 Kilowatt (KV) Transmission Line providing mines in the Bisti and Star Lake areas with electrical power would be erected in eastern McKinley County and southern San Juan County by the Public Service Company of New Mexico (PNM). The preferred route to be taken by the transmission line has not yet been selected, but the primary axis of transit would be northwest-southeast. The terrain it would traverse is sparsely populated, desert range land in the territory of the Eastern Navajo Agency. At various points along the transmission corridor, the power line would be within 40 miles of Farmington, the trade center of San Juan County, 30 miles of Crownpoint, the urbanizing community which is located amid developing coal and uranium fields, and 30 miles of Cuba, the only population center of more than 500 persons in western Sandoval County.

These areas and communities are described in detail in Chapter 2 of the Regional Analysis. Refer to that portion of this Environmental Statement for additional information.



## CHAPTER 3

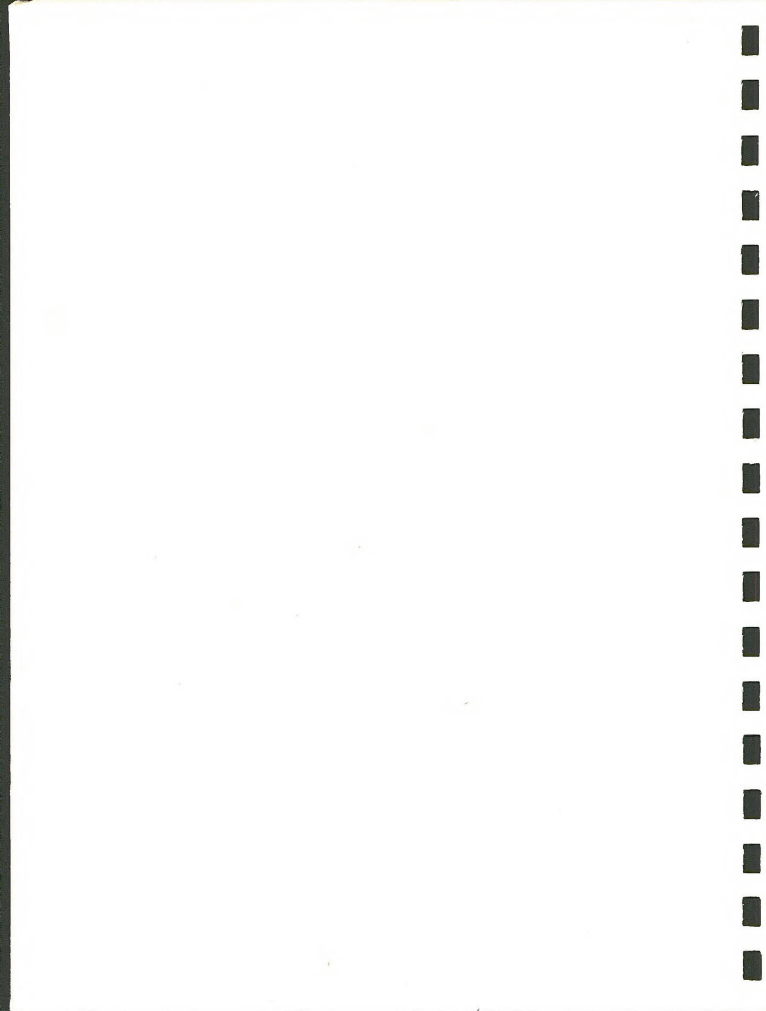
### ASSESSMENT OF IMPACTS

#### SOCIOECONOMIC CONDITIONS

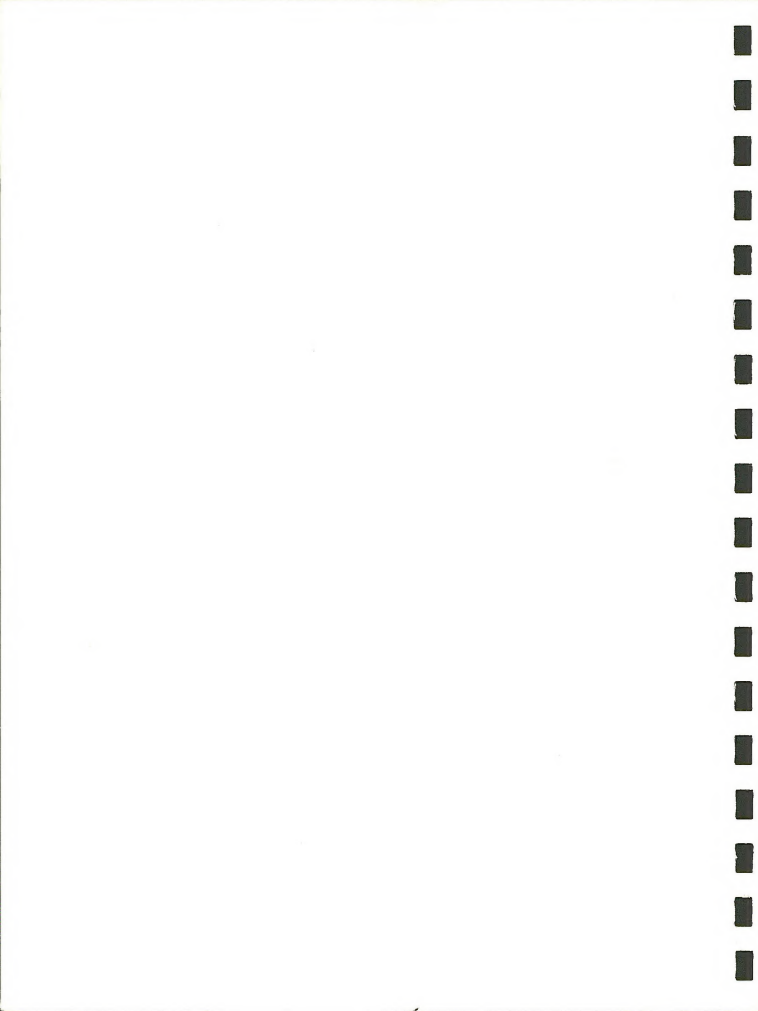
The Fruitland Coal Load would by itself have no significant socioeconomic impacts on communities in eastern McKinley, western Valencia, or southern San Juan Counties. The construction of the 230 KV Transmission Line would employ no more than 35 workers at any given time in the period 1979-1984. Actual employment would be characterized by a larger number of part-time personnel. Most of these workers would be highly skilled electrical linemen and other specialists already employed in the Four Corners area or brought in from outside the region. Working in teams, they would lay down components of the line at distinct intervals. Their presence in northern New Mexico would be limited duration; these transients would not register major impacts. Similarly, most materials would likely be supplied by vendors from outside northwestern New Mexico and indirect impact would therefore be minimal. Operation and maintenance of the line would require no regular payroll and little spending from purchases in the area.

Pending route selection, it is impossible to project relocation impacts on residents of the right-of-way, or disruptive effects on agricultural activities.

Insofar as the 230 KV Transmission Line provides an essential service to mines in the area, it would contribute to socioeconomic impacts outlined in Chapter 3 of the Regional Analysis. Refer to that portion of the Environmental Statement for additional information.



SITE SPECIFIC ANALYSIS:  
IDEAL BASIC LA VENTANA MINE



## CHAPTER 2

### DESCRIPTION OF THE ENVIRONMENT

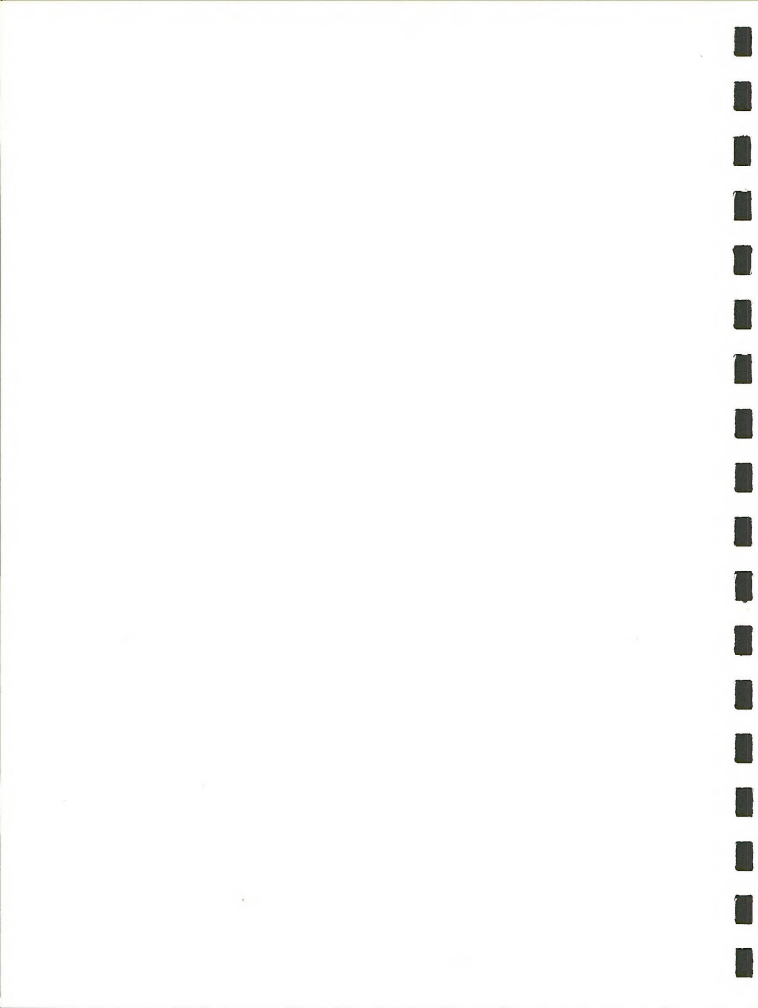
#### SOCIOECONOMIC CONDITIONS

An underground coal mine proposed by Ideal Basic Industries, Inc. would be located 20 miles south of Cuba in the valley of the Rio Puerco in western Valencia County. The mine would extend under portions of New Mexico Highway 44, the principal thoroughfare connecting Albuquerque and Farmington.

The LaVentana Mine would be situated in a sparsely populated area of northwestern New Mexico. The closest incorporated community would be Cuba, with 550 inhabitants in 1977. The villages of Jemez Springs and San Ysidro are hamlets located 20 to 30 miles to the east. Albuquerque and its environs are within 75 miles highway driving distance, with suburban communities like Bernalillo and Rio Rancho distant by only 40-50 minutes commuting travel time. Therefore, the ES Region for a socioeconomic analysis of the LaVentana Coal Mine is essentially the Albuquerque Standard Metropolitan Statistical Area (SMSA)--Bernalillo and Sandoval Counties.

As previously mentioned, the vicinity of the proposed mine is serviced by New Mexico State Highway 44, which connects with Interstate Highway 25 outside Bernalillo, and U.S. Highway 550 at Aztec. More than half of the roadway miles on this route are judged to be deficient in terms of condition or surface or foundation, type of design, or qualities of safety.





## CHAPTER 3

### ASSESSMENT OF IMPACTS

#### SOCIOECONOMIC CONDITIONS

Impact on social and economic conditions in the Albuquerque SMSA would be negligible, due to the relatively small size of the proposed action in relation to the metropolitan community. However, the La Ventana Mine of Ideal Basic Industries would constitute a much greater impact on western Valencia County, a rural area with less than 4,000 inhabitants. The following sections examine the two contexts of mine development.

#### DEMOGRAPHIC FEATURES

Development of the La Ventana Mine would result in short-term population impacts of as many as 87 transient inhabitants of the Albuquerque SMSA. Although Ideal Basic Industries has considered ways to encourage its workers and those of its contractors to settle in Cuba, it is expected that most would choose to live in the northern suburbs of Albuquerque. In 1980, however, while the 87 additional inhabitants created by mine development in 1980 would be less than 0.1 percent of the SMSA's population, they would constitute more than 2.5 percent of the population of Bernalillo and Sandoval counties. By 1985, when the mine is in full operation, the 748 added residents of the SMSA would still be less than 0.2 percent of the area's total population, but would represent a nearly 20 percent increase in the population of western Sandoval County.

The above projections of increases in the number of the inhabitants of the SMSA due to the proposed action represent a maximum level of population impacts. The stated determination of Ideal Basic Industries to hire local residents of Cuba and its surroundings to fill positions at the La Ventana Mine would minimize immigration and reduce area gain in population. The company's objective is to obtain a work force with ties in the surrounding area, and commitments to part-time ranching (as is common in the vicinity of Cuba). This strategy is designed to cut labor turnover and to avoid the undesirable characteristics of transient population on mining communities.

#### ECONOMIC CHARACTERISTICS

Table 3-1 profiles employment resulting from development and operation of the La Ventanamine in the first year of operation. The facility

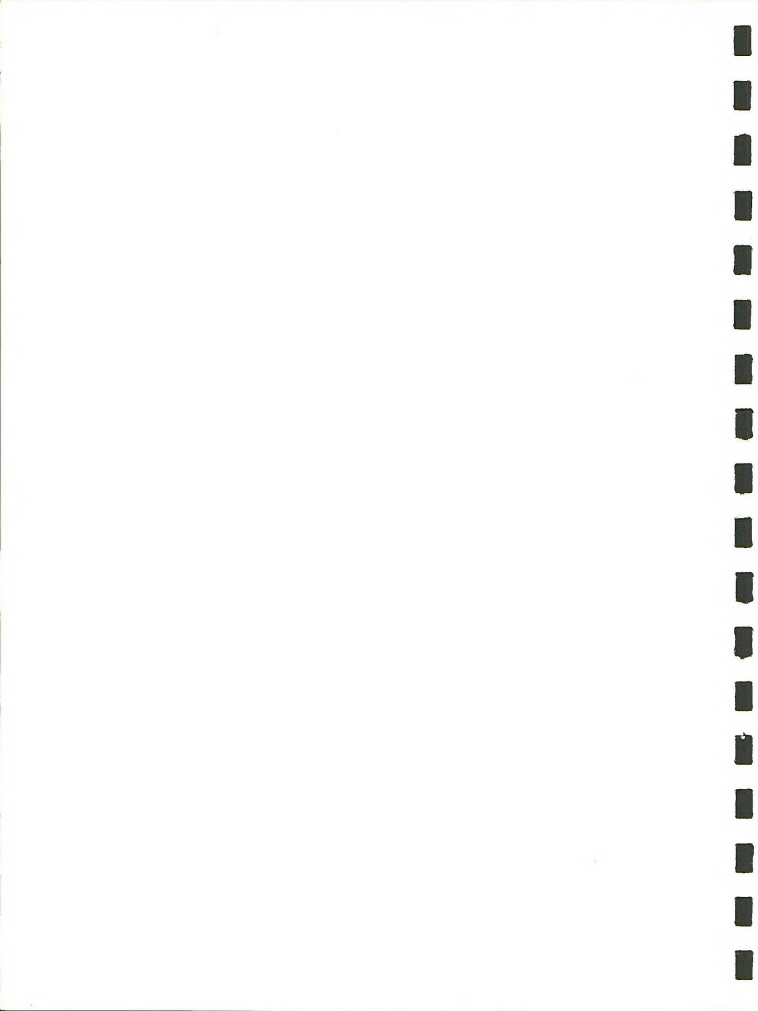
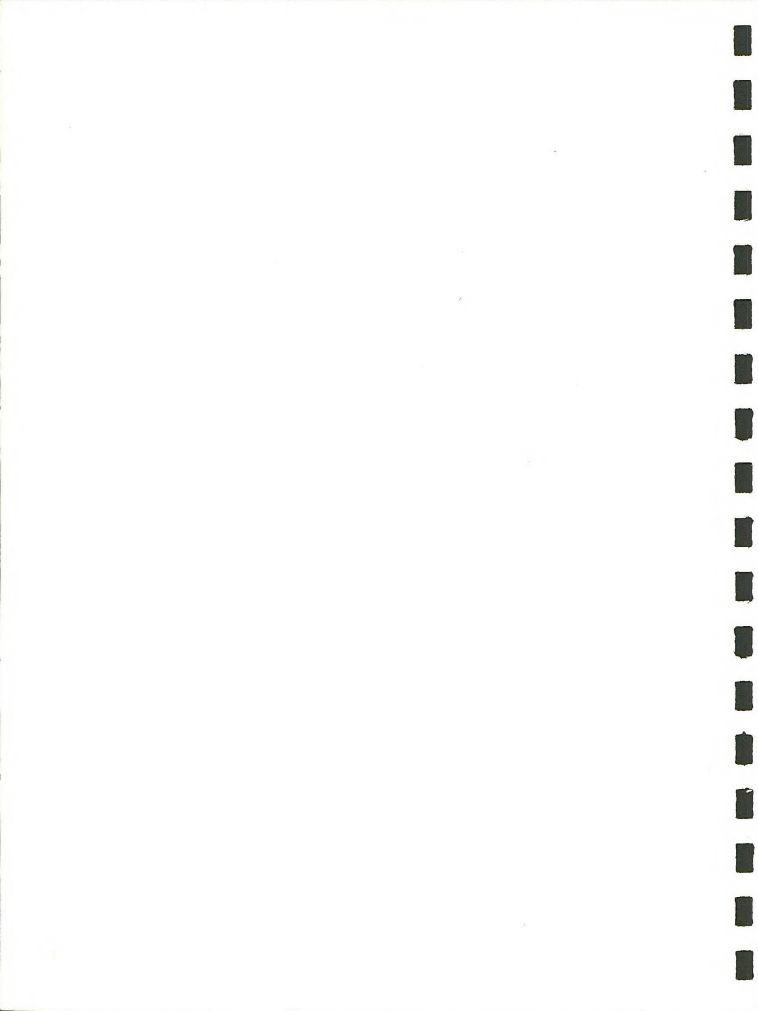


TABLE 3-1.

IDEAL BASIC INDUSTRIES LA VENTANA MINE: DIRECT AND INDIRECT EMPLOYMENT GENERATED.1980 - 1990

<u>Type of Employment</u>	<u>1980 No. of Workers</u>	<u>Percent Increase With Proposed Action</u>	<u>1985 No. of Workers</u>	<u>Percent Increase With Proposed Action</u>	<u>1990 No. of Workers</u>	<u>Percent Increase With Proposed Action</u>
TOTAL	200	0.1	544	0.1	544	0.1
INDIRECT	90	0.1	244	0.1	244	0.1
DIRECT	110	0.1	300	0.1	300	0.1

Source: Harbridge House, 1978.



would employ 110 persons directly and indirectly create jobs for another 90 workers. In 1985 and 1990, both years of full production, 300 miners would be on the payroll of Ideal Basic Industries and 244 workers would hold jobs as an indirect result of that direct employment. In terms of the Albuquerque SMSA, jobholding at the La Ventana Mine would be relatively insignificant. However, the facility would be the largest single employer in western Sandoval County, dominating payrolls in the Cuba area.

#### COMMUNITY INFRASTRUCTURE

Table 3-2 indicates the relative insignificance of projected population and employment impacts at the LaVentana Mine, in terms of secondary impacts on community infrastructure.



TABLE 3-2

IDEAL BASIC INDUSTRIES LA VENTANA MINE: COMMUNITY FACILITIES AND  
SERVICES IMPACTS, 1980 - 1990

<u>Community Facility or Service</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
HOUSING UNITS			
Additional Units Needed with Proposed Action	98	267	267
Percent of Total Without Proposed Action	0.1	0.1	0.1
EDUCATIONAL SYSTEMS			
Additional Teachers Needed with Proposed Action	1	6	6
Percent of Total Without Proposed Action	0.0	0.1	0.1
HEALTH CARE SYSTEMS			
Additional Doctors Needed with Proposed Action	0	2	2
Percent of Total Without Proposed Action	0.0	0.1	0.1
POLICE PROTECTION			
Additional Policemen Needed with Proposed Action	0	1	1
Percent of Total Without Proposed Action	0.0	0.1	0.1
FIRE PROTECTION			
Additional Firemen Needed with Proposed Action	0	1	1
Percent of Total Without Proposed Action	0.0	0.1	0.1

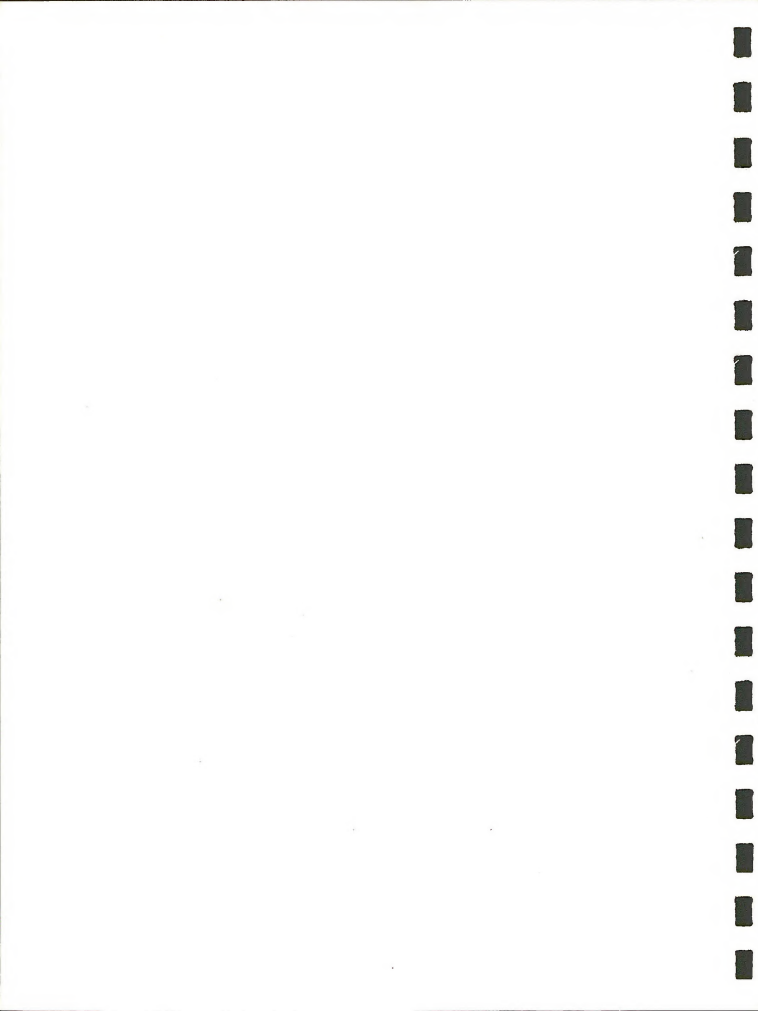
Source: Harbridge House, Inc., 1978





SITE SPECIFIC ANALYSIS:

STAR LAKE RAILROAD



## CHAPTER 2

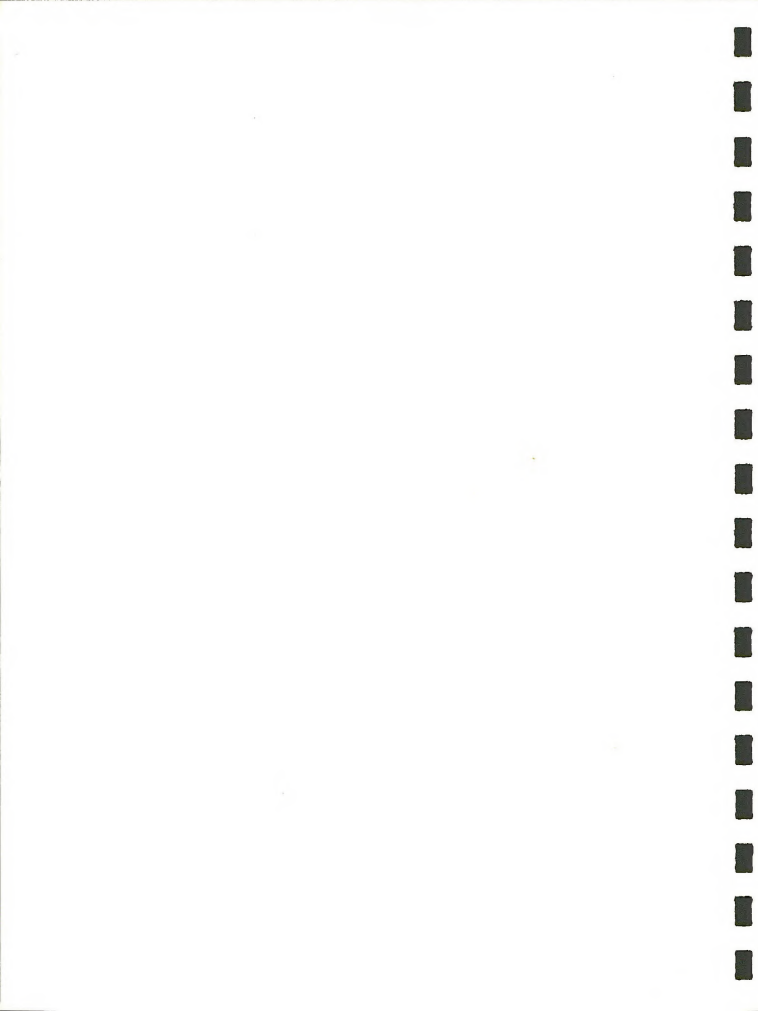
### DESCRIPTION OF THE ENVIRONMENT

#### SOCIOECONOMIC CONDITIONS

The proposed Star Lake Railroad line would follow a course beginning at existing lines near Prewitt in McKinley County to potential coal mines and other resource-related developments in eastern McKinley and southern San Juan Counties. The approximately 115-mile line would run across sparsely populated areas and serve as a primary means of coal (and equipment, materials, supplies) transport in the ES region. The railhead site near Prewitt would be located in an area already experiencing rapid growth due to uranium development.

Roadways which would provide access to the line for construction and maintenance purposes include New Mexico State Highway 371, of which over one-half is currently under construction or is only a proposed route at this time. New Mexico 57 (through which the proposed line would pass) connects Crownpoint with N.M. 44 at the Blanco Trading Post. The majority of the proposed line would not be near other than small settlements, with few available housing facilities or other social support systems.

The primary assessment region has been defined to encompass McKinley County, and the northern portion of Valencia County, particularly Grants and Milan. Refer to Chapter 2 of the Regional Analysis for an extensive description of infrastructural conditions of the existing environment in these counties.



## CHAPTER 3

### ASSESSMENT OF IMPACTS

#### SOCIOECONOMIC CONDITIONS

As may be seen from the sections which follow, the specific social and economic impacts of the Star Lake Railroad would be minimal. However, the railroad would be built to service mines some of which would be located on public lands, and are included in the Regional Analysis. The cumulative effects of construction and operation of the railroad and those mines it would serve are also presented here. These cumulative impacts which would stem specifically from the planned rail line are discussed in the sections below.

#### DEMOGRAPHIC FEATURES

Construction of the Star Lake Railroad would involve a labor force of 310 men at the peak of building activity, in 1980. Up to 200 of these workers are expected to be residents of the ES Region. More than not of this work-force would consist of employees of the Santa Fe Railroad; these workers would perform minor dress work and lay down track. 100 of these in-organization workers would be a steel gang made up entirely of Navajo Indians. The Santa Fe Railroad uses this team of Navajo workers on all track laying projects.

Santa Fe steel gang camps would be composed of railroad bunk cars. Initially the cars would be placed on a siding at Bluewater. As trackage is completed, the bunk cars would be moved to the new main line siding at Prewitt, and as needed to sidings at Mileposts 23, 42 and 55 on the Star Lake line. The next location would be the north leg of the wye at Pueblo Pintado. On the Gallo Wash line the camp would be on spurs at Mileposts 10 and 30.

Approximately 200 employees of contractors would be engaged in some or all elements of grading, bridge and culvert construction, fencing, and operation. The source of these workers cannot be predicted. The Star Lake Railroad would intend to use local residents whenever possible. However, it has been assumed that a percentage of these laborers would be non-local, comparable to regional averages in resource development (see Technical Appendix).

The general contractor's work camp for the south end would be established on an existing trailer camp at Prewitt. Self supporting camps would be located at Hospah, Gallo Wash and a possible location at Pueblo Alto. The fencing contractor, due to the absence of adequate service roads and a small force of 15 men, would probably move his trailers in increments of about 10 miles along the right-of-way.



TABLE 3-1

STAR LAKE RAILROAD: HIGHWAY USE IMPACTS

<u>Road Designation</u>	<u>Average Rating<sup>a</sup></u>	<u>Description of Impact</u>	<u>Estimated Costs</u>
N.M. 371	15.8 miles: 62; 40 miles: under construction or proposed	Indirect impact of acceleration of required improvements due to increased truck traffic usage of road as access to line.	None
N.M. 57	27 miles: 03	Direct impact of grading to improve surface, with decreased road life due to increased truck traffic usage of road as access to line.	None
Navajo Route 9	Not rated	Indirect impact of acceleration of required improvements due to increased truck traffic usage of road as access line.	None
Various local area roads	Not rated	Direct impact of connecting and grading smooth existing local traffic roads to provide a permanent access route to the proposed rail line.	None
Navajo Route 46	Not rated	Contributes to direct impact (with Star Lake Mine) of grading, draining and surfacing to provide access to area.	\$2.5 million <sup>b</sup>

Notes: <sup>a</sup> New Mexico State Department of Highways Condition Rating for appropriate roads and portions thereof affected by action, a rating of 74 or less indicating deficient condition.  
(See Regional Analysis Appendix A for description of rating method; refer to Map 2-6, Regional Analysis, for route locations.)

<sup>b</sup> One-half of estimated total cost.

Sources: New Mexico State Department of Highways, 1976.  
Navajo Area Roads Office (Gallup, New Mexico), 1977.  
Harbridge House, Inc., 1977.





A 25-man engineering headquarters would be established permanently in Grants. Other temporary engineering camps would be located close to the general contractor's camps. All camps would have mess and dorm facilities. Food, catering service, fuel, work clothing and miscellaneous supplies would be obtained from the local economy. It is possible that local suppliers of quantity materials such as fencing, pipe, etc. could be successful bidders.

Several aspects of the population impacts of the proposed railroad construction are unique. First, all the significant increases in population would occur during the construction phase, and would occur very rapidly. In 1977 there would be no impact. In 1980 construction would peak, leading to an increase in population with the railroad of 921. By 1985 the construction would be completed and the railroad in operation. Consequently, there would be no long-term population effect from construction of the railroad. In 1985 the operational impacts would stabilize at 103 and remain at that level through 1990. In 1980 the railroad would account for 12.4 percent of the coal-related regional population increase, or .5 percent of the total population projected for the region. For 1985 and 1990, these figures would drop to 1.3 and 1.0 percent of the ES Region's coal-related increase. Of the 103 permanent residents created by operation of the railroad, 52 would live in McKinley County, and 51 in Valencia County. In 1985 and 1990 this would account for 1.6 and 1.1 percent of McKinley County's, and 6.3 and 4.6 percent of Valencia County's coal-related population increases, respectively.

Many legal and unauthorized occupants reside in the general area of the proposed railroad right-of-way. However, no parties have been identified to date living within the proposed right-of-way.

The railroad would make possible development of additional coal mines in the region which would otherwise not exist in the future without the proposed action. There would be a 0.9 percent increase in regional population with the railroad in 1980 above that projected for the future with only partial development, which would include the coal mines, power line, and power plant, but no railroad. Construction would account for a 79.2 percent increase in the regional coal-related population in 1980, 17.0 percent in 1985, and 19.1 percent in 1990 above levels projected without the proposed action.

#### ECONOMIC CONDITIONS

One-third of the jobs involved in the construction of the Star Lake Railroad would be taken by the Santa Fe Railroad's permanent Navajo line workers. The Star Lake Railroad would add to employment and income in the five county area, as shown in Tables 3-2 and 3-3, but the extent of these incremental gains would be slight. Construction of the proposed railway would involve a peak labor force of 310 persons (including the permanent track layers). The total construction payroll would peak in 1980 at \$5.86 million. The building of the Star Lake Railroad would be highly seasonal in its labor requirements and tempo of activity. Whereas employment in the summer of 1980 is anticipated to reach 310, at the end of that year, it would have dropped to about 200. The entire line would be completed within the space of four years.



TABLE 3-2

STAR LAKE RAILROAD:DIRECT AND INDIRECT EMPLOYMENT CREATED, 1980-1990

<u>Type Employment</u>	<u>1980 Number of Jobs</u>	<u>Percent Increase<sup>a</sup> With Proposed Action</u>	<u>1985 Number of Jobs</u>	<u>Percent Increase With Proposed Action</u>	<u>1990 Number of Jobs</u>	<u>Percent Increase With Proposed Action</u>
TOTAL	742	1.0	80	0.1	80	0.1
INDIRECT	432	0.6	42	---	42	---
DIRECT	310	0.4	38	---	38	---

Note: <sup>a</sup>increase in total employment in five county area.

Source: Harbridge House, Inc., and Larry Adcock and Associates, programming of Input-Output Model as described in Technical Appendix, 1978.

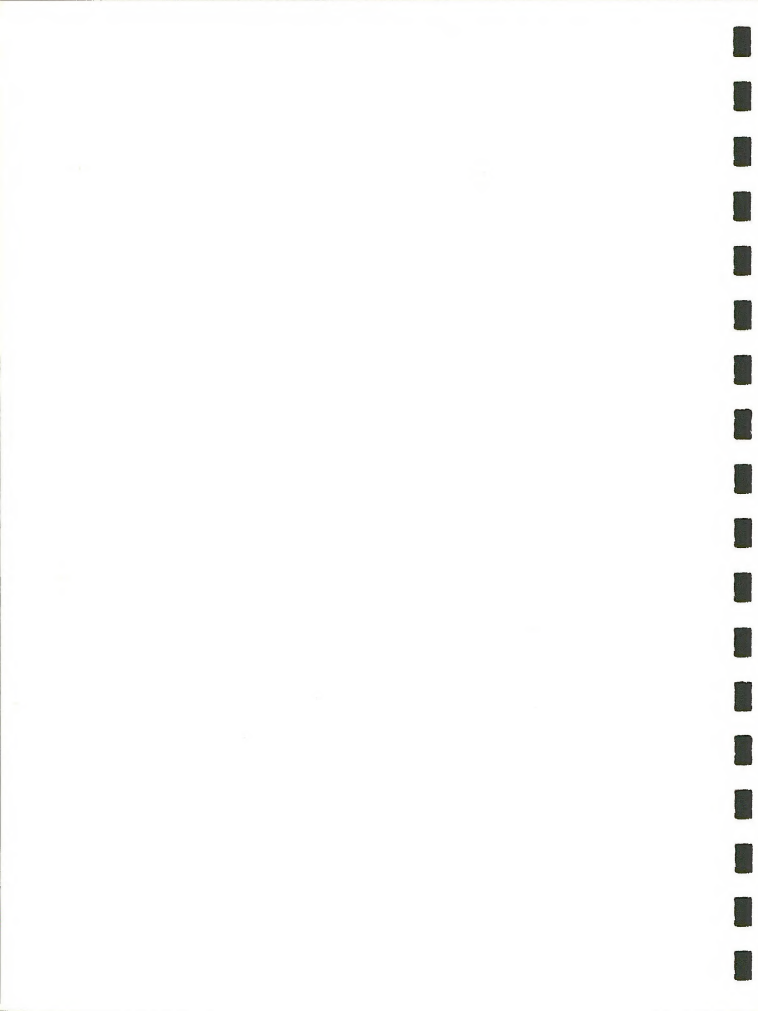


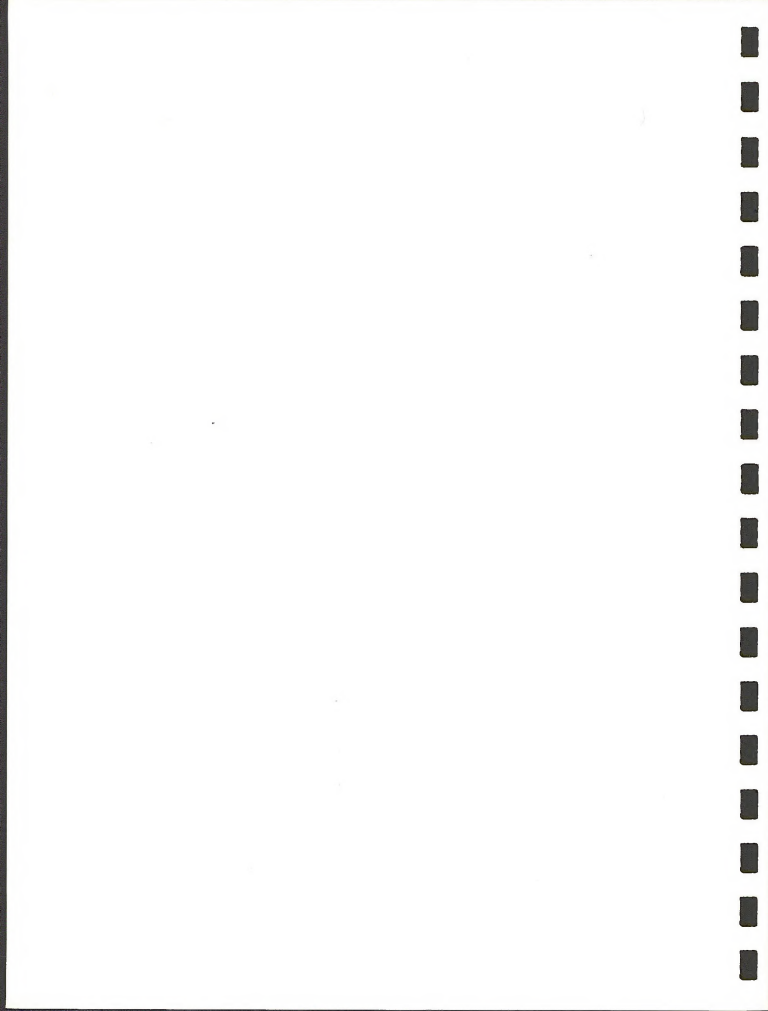
TABLE 3-3

STAR LAKE RAILROAD:ESTIMATED ANNUAL PERSONAL INCOME, 1980-1990  
(in thousands of 1977 dollars)

<u>Year</u>	<u>Annual Total Personal Income</u> <sup>a</sup>	<u>Percent Increase with Proposed Action</u> <sup>b</sup>
1980	10,696.6	1.6
1985	1,128.6	0.1
1990	1,128.6	0.1
Total	37,225.6	1.5

Note: <sup>b</sup> Increase in total personal income in five county area.

Source: <sup>a</sup> Larry Adcock and Associates, 1978



Operation of the Star Lake Railroad would begin in 1981 with a permanent work force of 38 persons attached to the line. While the projected number of construction-phase workers would be significant, were it to represent a long-term addition to area payrolls, it would not be important given the shortness of the phase as planned. The operation-phase work force is so small as to be insignificant in the context of the projected growth and development of the economies of northwestern New Mexico, as shown in Table 3-2. Operation-phase payrolls are projected at a constant \$661,000 a year beginning in 1982. The Santa Fe Railroad would expect to hire local residents for these jobs.

Until contracts for materials have been let, no estimate of impacts from capital expenditure can be projected. Primary sources for steel and other items would likely be CF&I Steel in Pueblo, Colorado, and United States Steel in Gary, Indiana. Up to June 30, 1978, Santa Fe will have spent \$2.1 million on pre-construction expenditures.

### COMMUNITY INFRASTRUCTURE

#### Transportation.

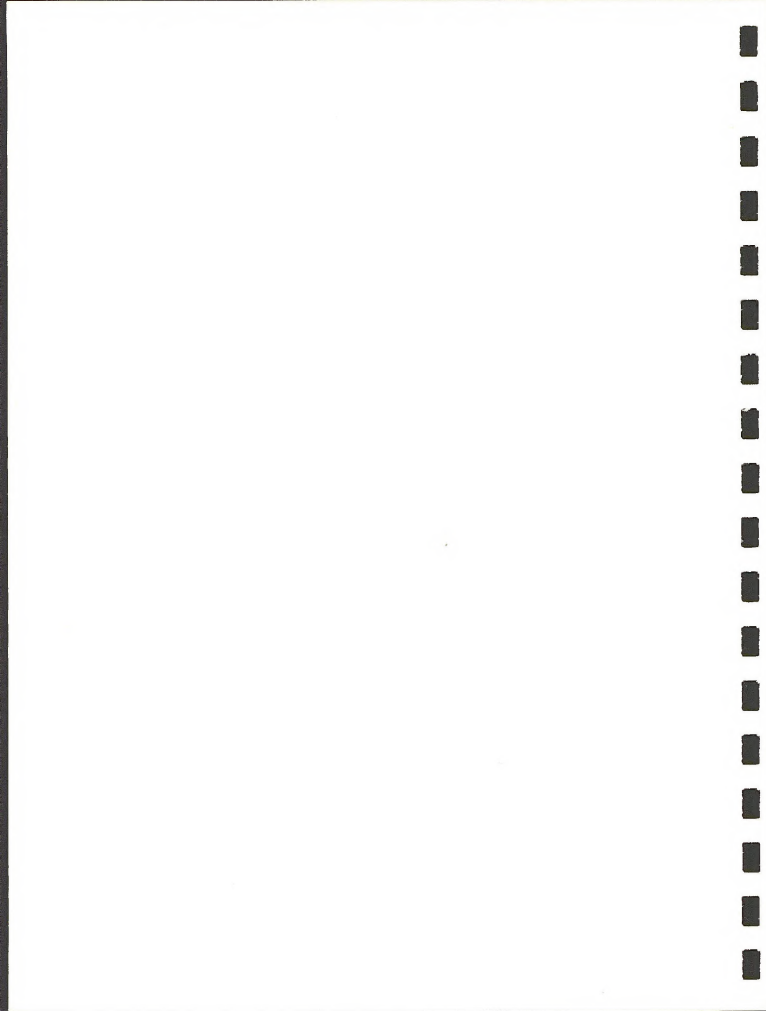
Access to the proposed route of the Star Lake Railroad for construction and maintenance purposes will require use of several existing and proposed roadways; specific impacts upon these routes are delineated in Table 3-2. Improvement of indicated Navajo Routes would have the combined positive impact of facilitating local transportation to schools, shopping, and recreational facilities. In addition, the railroad line itself would provide an efficient means of transport of equipment and materials to a relatively remote and inaccessible region.

Railcrossings pose a potential hazard to local travelers. Navajo Route 9 is paved where the railroad would cross. A rail overpass would be built at this location. Other crossings would be of dirt on gravel roads. This would create an undetermined degree of hazard for motorists in the area.

#### Housing.

Construction phase population would require concentrated increases in temporary housing stock (trailers) in the vicinity of the proposed site, as described in the demographic section. Santa Fe has no plans for permanent housing of their employees. The steel gang and fence crew would be housed by Santa Fe in bunk cars and trailers within the proposed right-of-way. The remaining population would create a peak demand for 270 additional mobile home units in the area in 1980, to be distributed between Prewitt, Hoshpah, Gallo Wash, and Pueblo Alto. This would be an increase of 2.1 percent in the ES Region's mobile home stock in 1980. In 1985 and 1990, there would be a permanent demand for 37 units to house the local residents which have been trained to maintain and operate the railroad. Since the operations headquarters would be in Grants, the demand for housing would most be felt there. Housing would be an insignificant increase compared to housing demand already existing in western Valencia County.





### Public Support Structures.

Tax revenues to be generated by the Star Lake Railroad would benefit McKinley County primarily. While the tax base would be expanded in the county with an increase in residents, an estimated 40-50 percent of the workers would not pay taxes locally because they commute from other areas. Because the projected increases in population and housing units are negligible, indirect impacts on local taxes would be minimal. Direct tax increases due to gains in assessed valuation are related to the capital investment in the railroad, projected at \$368,000 annually.

### Education.

There would be negligible impact upon educational systems in the ES Region. Schools in Prewitt specifically would be temporarily impacted, however, with an additional 30-40 students (an approximate 30 percent increase) during construction. Two additional teachers would also be required in the area. Facilities expansion (in the form of temporary modular classrooms) would be required for an estimated long-term increase in student enrollment due to the railroad of 10-15 percent.

### Health Services.

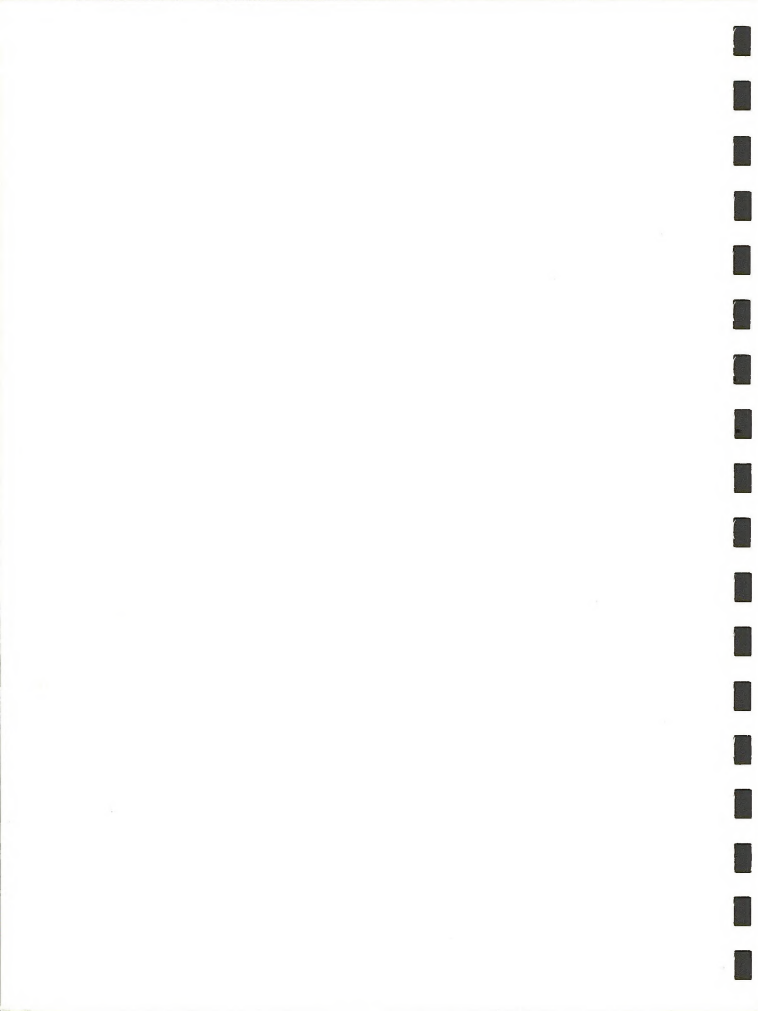
There would be no impact (less than one percent) on health care in McKinley and Valencia Counties in terms of facilities and personnel generally. At least one additional physician and registered nurse, with two additional hospital beds would be needed in the immediate vicinity of Prewitt to maintain national standards. This health care plus most emergency treatment could be provided by services in Crownpoint, Gallup and Grants, however.

### Public Safety.

An additional police officer would be required in the Prewitt area by 1980 to maintain recommended standards of protection. Police protection in other parts of McKinley County proximate to the route would be adequate between 1980 and 1990. There would be no impact on fire protection during this period. The volunteer department in Prewitt would be sufficient to handle projected new residents. The railroad crossings of dirt roads in the area would add an additional hazard to motorists, and might require additional patrol personnel.

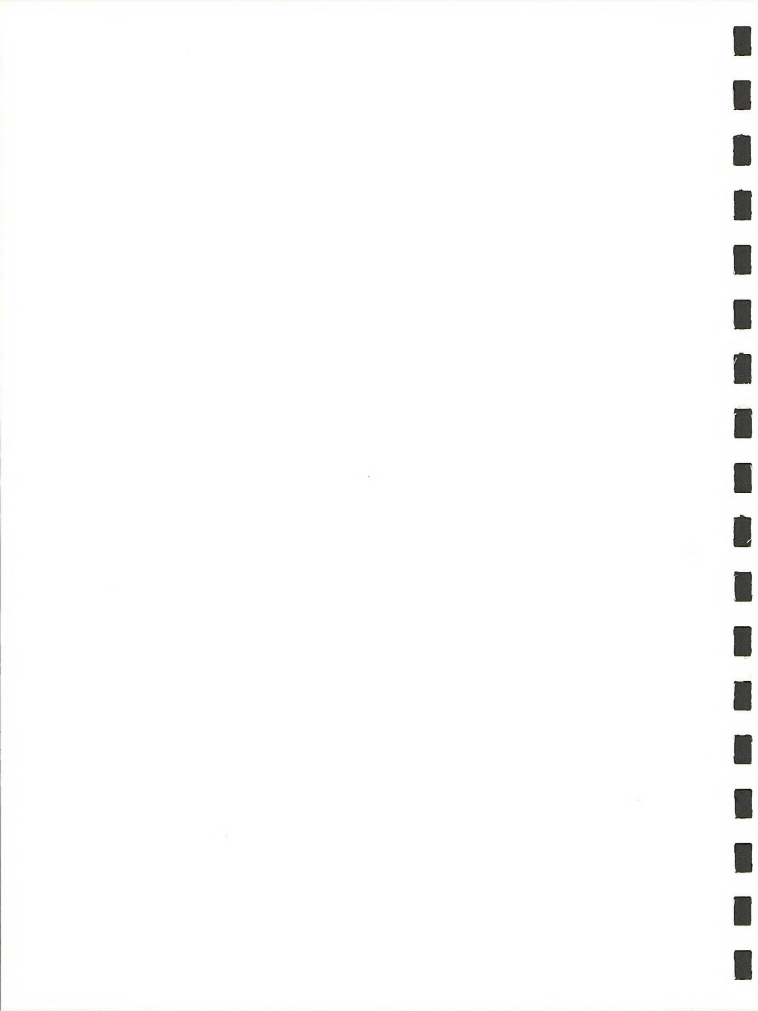
### Public Services.

Systems of waste disposal and wastewater would be strained with a population influx into the Prewitt area. Due to the extremely temporary nature of resident increases, however, a full-scale expansion of these systems would not be necessary. Projected work camps would be equipped with required short-term facilities by Santa Fe Railroad, which would absorb much of the demand placed on local systems. Water supply would be adequate and supply of utilities would be adequate in both the Prewitt and Grants/Milan areas.

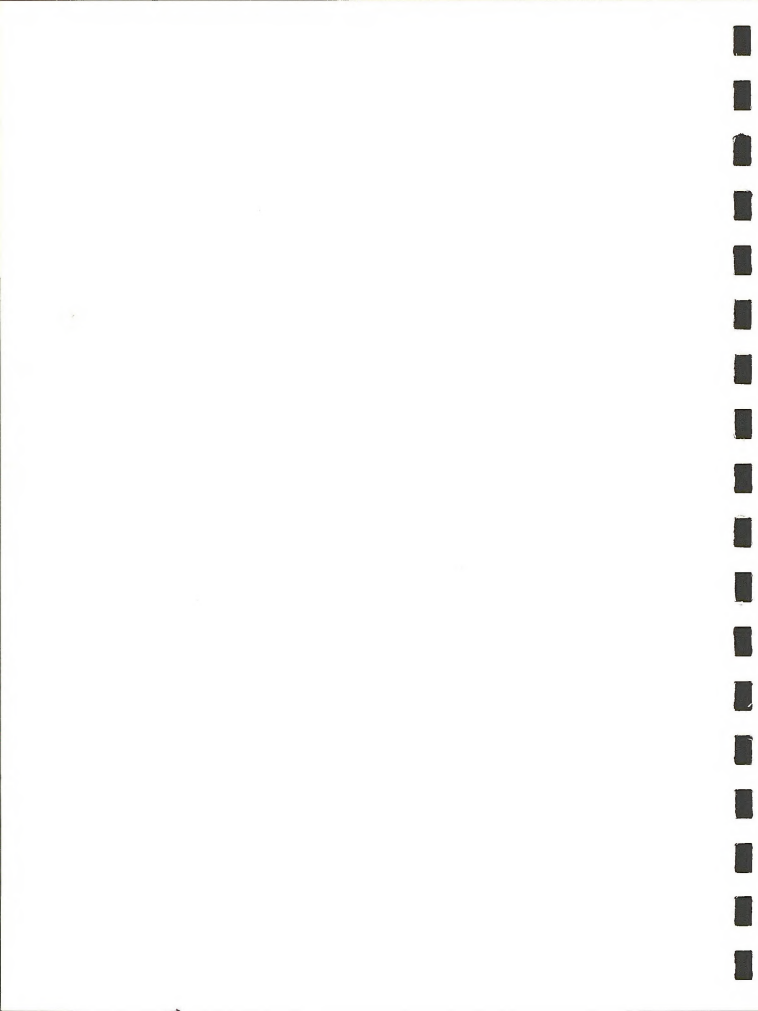


#### SOCIAL AND CULTURAL CHARACTERISTICS

Refer to the Regional Analysis for a full discussion of the impacts of resource development on communities and groups along the Star Lake Right-of-Way.



SITE SPECIFIC ANALYSIS:  
WESTERN COAL COMPANY BISTI MINE



## CHAPTER 2

### DESCRIPTION OF THE ENVIRONMENT

#### SOCIOECONOMIC CONDITIONS

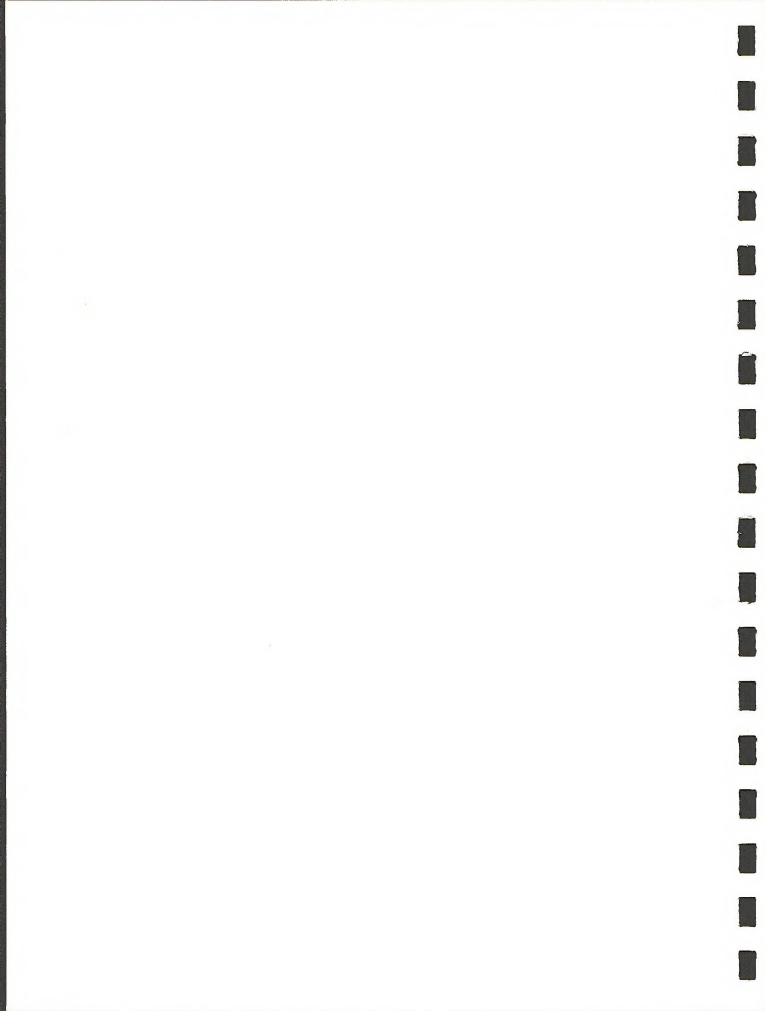
A surface coal mine proposed by the Western Coal Company would be located near the abandoned Bisti trading port in south central San Juan County. The Western Coal Company Mine would lie just to the north of the proposed New Mexico Generating Station of the Public Service Company of New Mexico.

The vicinity of Bisti is a sparsely populated area approximately 40 miles south of the incorporated San Juan River Valley communities of Farmington, Bloomfield, and Aztec, which have respective populations of 30,000, 3,000, and 6,500. The San Juan River Valley represents the major trade center for San Juan County, and adjacent areas. To the south is the unincorporated town of Crownpoint in McKinley County, the only major community located west of the Continental Divide and east of the Navajo Indian Reservation in the territory of the Eastern Navajo Agency.

Bisti is reached by New Mexico State Highway 371, of which more than 50 percent is either under construction or is unimproved. Approximately one-half of the existing roadway was rated deficient by the New Mexico State Highway Department in 1978. However, New Mexico State Highway 371 will represent a major paved route connecting Crownpoint, Bisti and Farmington after 1985, according to present construction schedules. The completed route will intersect Navajo Route 5 north of the Bisti sites, linking the area with New Mexico State Highway 44, the principal artery between Albuquerque and Farmington.

The primary assessment region has been defined to encompass San Juan County, principally Farmington, Aztec, and Bloomfield Highway systems in the vicinity of the mine site are expected to focus impacts from development and operation on the San Juan River Valley. Refer to Chapter 2 of the Regional Analysis for an extensive description of infrastructural conditions of the existing environment.





## CHAPTER 3

### ASSESSMENT OF IMPACTS

#### SOCIOECONOMIC CONDITIONS

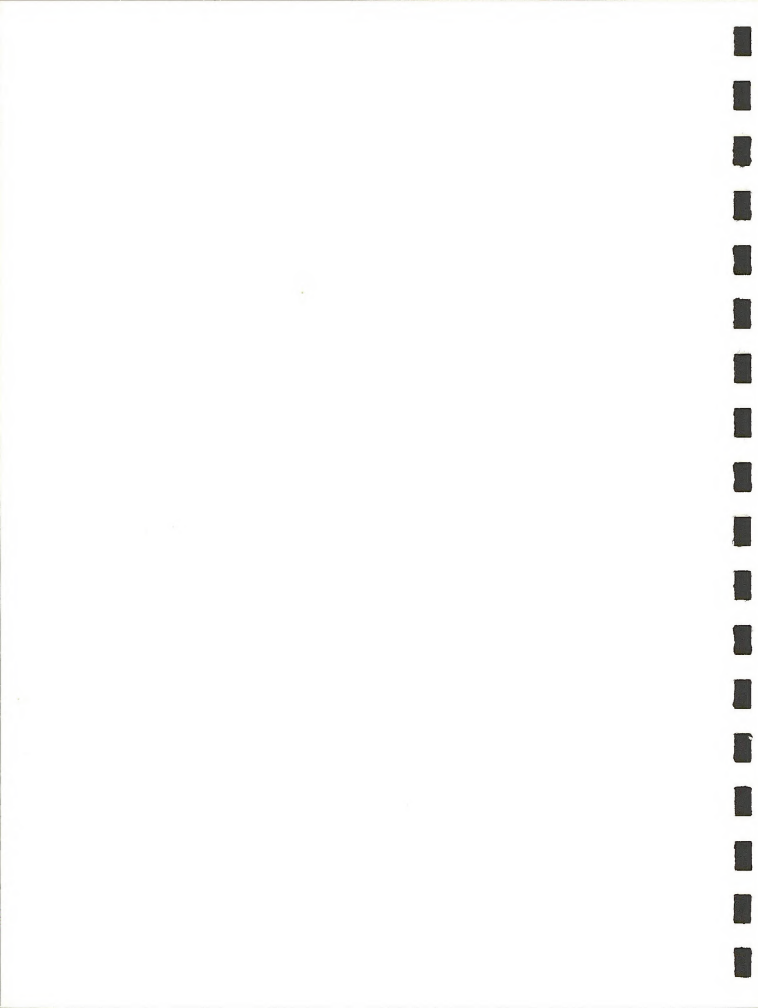
Impacts on social and economic conditions in San Juan County would chiefly stem from employment at Western Coal Company's Bisti facility, and related demographic, economic and infrastructural effects of mine construction and operation. However, some other direct impacts would be experienced: by residents of the site area, on roads leading to the site, and so forth. These are detailed below.

#### DEMOGRAPHIC FEATURES

The proposed action would result in an induced increase in the population of San Juan County as a result of employment opportunities created by mine investments, for which see below. In 1980, this increase is projected to be 487 persons, or 0.7 percent. Five years later, the gain in the number of the county's population would only be 468, or 0.6 percent. This decline would reflect the end of the development of the mine and the beginning of production, with concomitant reduction in hiring and spending at the mine. However, mining operations would be expanded by 1990; as a result, population impacts would increase to 927 persons, a gain of 1.1 percent over the projected population of San Juan County in the absence of the proposed action.

During the construction and development of Western Coal Company's Bisti Mine, most workers would likely be transient inhabitants of the region, staying for as long as their specialty or trade were required. These persons would be likely to live in mobile units outside established communities. However, with the start of coal mining, permanent increases in the population of San Juan County would occur, with as much as 80 percent of immigrants associated with the Bisti mine locating in the Aztec-Bloomfield-Farmington triangle. No impacts are projected for Shiprock or other areas of the Navajo Reservation, because most migrants to San Juan County would be Anglos who would be unlikely to settle in Indian communities.

In taking lands for the Bisti site, an undetermined number of legal residents and unauthorized occupants of lands in the vicinity would be forced to relocate. As many as 20 persons might be affected. Impacts would be almost immediate. Western Coal Company indicates that, according to its mining plan, the first unauthorized occupant would be encountered on leased public lands by the end of the first year of coal mining. For a full discussion of relocation impacts in relation both to legal residents and unauthorized occupants, see Chapter 3 of the Regional Analysis.



## ECONOMIC CHARACTERISTICS

Western Coal Company's Bisti mine would ultimately add approximately two percent to total employment in San Juan County. The construction phase would comprise 12 to 18 months during the period 1978-1980. A peak construction labor force of 200 workers is projected in 1980. Indirect employment impacts from these payrolls would constitute another 190 jobs. Together, employment in the construction and development of the Bisti Mine by Western Coal Company and its contractors would represent a gain of 0.6 percent over future levels without the proposed action. These impacts are shown in Table 3-1.

Western Coal Company would open a small mine at Bisti in mid-1980. Initial production of 250,000 tons a year from this operation would be trucked to the San Juan Generating Station west of Farmington. 28 persons would be employed full-time. The mine would subsequently expand operations, increasing employment to 195 in 1985 and 385 workers in 1990. In addition to these direct employment impacts of the proposed action, indirect employment impacts would result from the capital outlays and payroll spending for the mine. These expenditures would combine to increase regional economic activity and to generate more jobs in all sectors as shown in Table 3-1. In 1985 there would be 170 jobs created indirectly as a result of the proposed action. With full mine operation after 1982, a total of 338 would be added to the number of jobs held by residents of San Juan County. Table 3-1 contrasts these anticipated impacts with the levels of employment projected for the two counties in the absence of proposed action as earlier shown in Table 2-32 in Chapter 2 of the Regional Analysis. As may be seen, in 1990 direct and indirect jobs would constitute a gain of 2.1 percent.

Impacts on total personal income from the Western Coal Company's Bisti Mine would be comparable to impacts on jobs. By 1990, the mine would possess payrolls of approximately \$6.8 million (at 1977 dollar values and wage rates). Direct and indirect employment afforded by the proposed action would contribute \$10.1 million a year to total personal income of San Juan County, a gain of 2.8 percent. Average wages at the mine are expected to approximate \$20,000 a year in 1977 dollars. This is well above the present average for San Juan County, which remains below \$10,000 annually. Although jobs created indirectly by the proposed action would probably conform to general patterns of compensation, the development and operation of the mine would have the effect of creating a disproportionately large number of high-paying jobs in the construction and mining sectors. Thus, the Bisti mine would contribute to economic pressures pushing the average wage level in San Juan County up and, not only add to total personal income, but to per capita income as well.

However, development and construction of the Bisti mine by Western Coal Company would also have adverse impacts, notably on grazing in the vicinity of the site. The lands which would be under lease have carrying capacities of 505 animal unit months (AUMs). These would be lost with the beginning of development. The effect of this loss would not be



TABLE 3-1

WESTERN COAL COMPANY BISTI MINE:DIRECT AND INDIRECT EMPLOYMENT CREATED, 1980-1990

<u>Type of Employment</u>	1980 <u>No. of Jobs</u>	1985 <u>No. of Jobs</u>	1990 <u>No. of Jobs</u>
TOTAL	390	365	723
INDIRECT	190	170	338
DIRECT	200	195	385

Source: Harbridge House, Inc., and Larry Adcock and Associates, programming of Input-Output Model as described in Technical Appendix, 1978.



significant in terms of San Juan County's economy as a whole. However, it would serve to undermine the traditional, pastoral economy practiced by generations of Indians in the area. Indian inhabitants of southern San Juan County might also be led to give up subsistence ranching for high-wage employment at the Bisti mine; while such jobs would permit these persons to earn a much higher income while remaining in their homeland, as discussed in Chapter 3 of the Regional Analysis.

#### COMMUNITY INFRASTRUCTURE

Revenues of both state and local governments would benefit from development and operation of the Bisti Mine. However, additional demand for services presented by immigrants would necessarily increase local government expenditures. Local property taxes would rise by \$189,270 in 1980, \$465,060 in 1985, and \$929,130. Gross receipts from taxes would rise by \$15,000 in 1980, \$14,500 in 1985, and \$28,400 in 1990. By contrast, revenue requirements to meet the revenue needs of an increasing population would grow by \$1.5 million in 1980, \$600,000 in 1985 and \$900,000 in 1990. Only by the latter year, would expansion of local tax base have caught up with expansion of community services and facilities. Without federal or state aid in the period 1978-1988, San Juan County would be forced into deficit spending to accommodate the Bisti Mine, by \$1.4 million in 1980 and \$100,000 in 1985. By 1990, local finances would have expanded sufficiently to provide for more impact. Specific impacts on components of community homes infrastructure would be negligible. Impacts on roadways would be increased by present plans of Western Coal Company to haul coal by truck from the Bisti Mine to the San Juan Generating Station via N.M. Highway 371 during the period 1980-1982. Forty truck trips a day would be made on this route using vehicles in the 20 to 30 ton range. Given the poor conditions of N.M. Highway 371, the trucks would be chosen for rugged travel conditions.

#### SOCIAL AND CULTURAL CHARACTERISTICS

For a detailed assessment of the cumulative impacts of proposed actions on federal lands see the Regional Analysis. Individual mines like Western Coal's would be unlikely to have significant impacts.



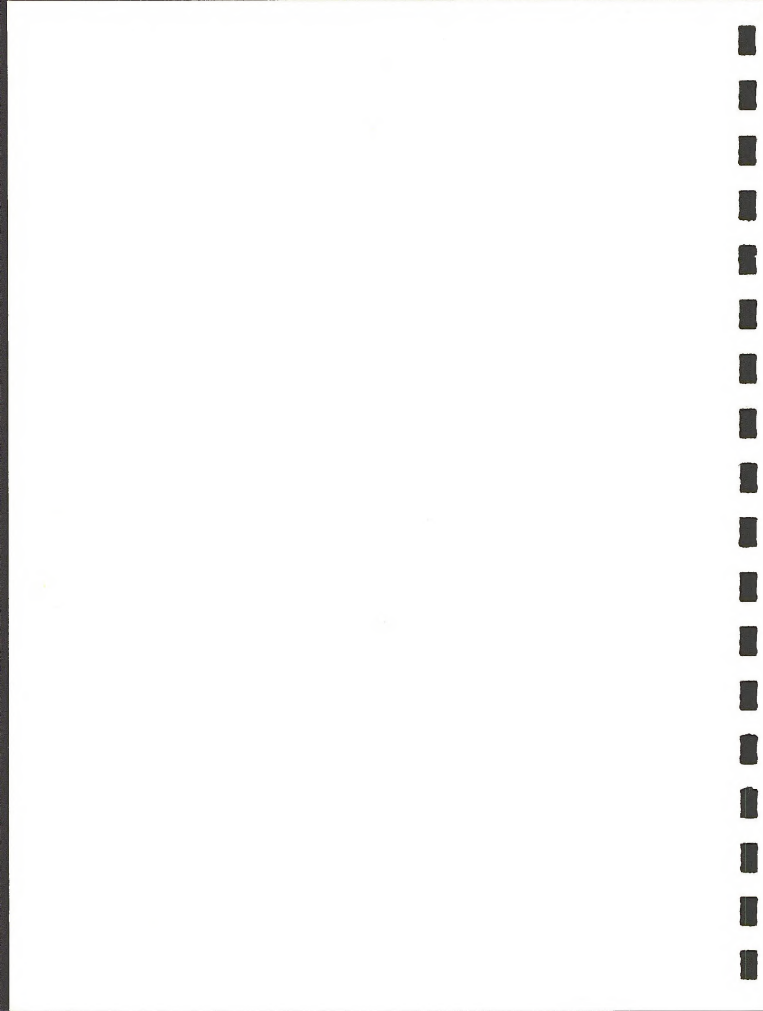


TABLE 3-2

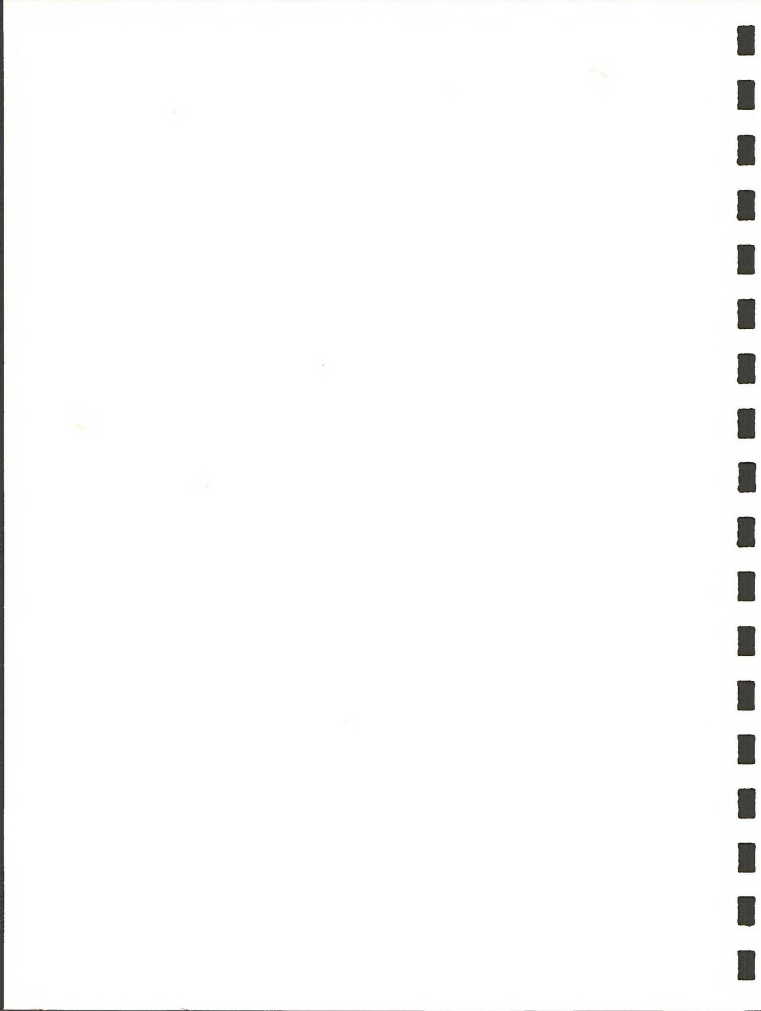
WESTERN COAL COMPANY BISTI MINE: HIGHWAY USE IMPACTS

<u>Designation</u>	<u>Rating</u>	<u>Description</u>	<u>Significance</u>
N.M. 371	15.8 miles: 62; 40 miles: under construction or proposed	Indirect impact of acceleration of required improvements due to use by commuting workers and equipment haulers as access to site, and coal hauling trucks.	Major
Navajo Route 5	Not rated	Indirect impact of acceleration of required maintenance and improvements (grading, draining and surfacing) due to increased commuter traffic from Bloomfield/Aztec area.	Minor
N.M. 44	22 miles: 47.7	Indirect impact of acceleration of required maintenance and improvements due to increased commuter traffic from Bloomfield/Aztec area.	Minimal

Sources: New Mexico State Department of Highways, 1976.  
Navajo Area Roads Office (Gallup, New Mexico), 1977.  
Harbridge House, Inc., 1977.



REGIONAL APPENDICES

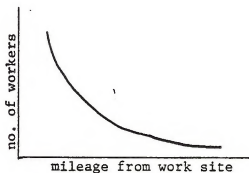


## APPENDIX A

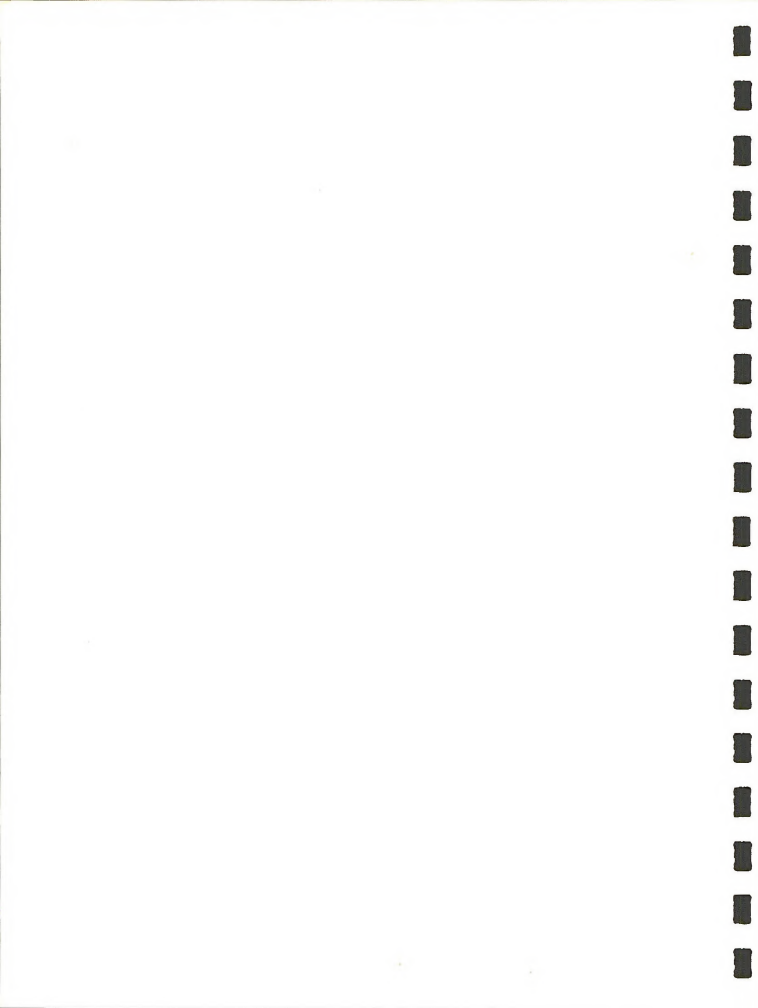
### AN EXPLANATION OF POPULATION ESTIMATES, AND PROJECTIONS OF METHODOLOGY

#### DEFINITION OF ES REGION

Observation suggests that willingness to commute to a particular site is in a large part a function of driving distance. The greater the mileage which must be driven, the fewer the workers who would be willing to commute to that site. The graph shown below indicates this relationship as a logarithmic curve. It suggests that there would be some workers who would be willing to drive 300 miles round-trip, but that a majority would not drive more than 75 miles each way, or 150 miles round-trip:



Obviously, a standard daily commuting distance cannot be absolute, unless such a long distance is chosen that it includes all commuters. The test of the adequacy of any standard must be whether it accounts for the behavior of most workers. A daily commuting distance of 75 miles has been taken as appropriate in the study of northwestern New Mexico. This is the figure mentioned as approximately the limit of local commuting by Mayor Edward M. Wells of Grants in his testimony before the U.S. Senate Subcommittee on Regional and Community Development last August (U.S. Senate, 1977). It is corroborated by a recent study of labor force mobility in north-central New Mexico (Carruthers, et.al., 1975). Although there are undoubtedly some workers who drive longer distances to and from their place of work, this distance seems most defensible.



## POPULATION ESTIMATES

Baseline population figures were derived from several sources. Primary among these sources was the Bureau of Business and Economic Research at the University of New Mexico. This organization serves as the official state population estimating and projecting agency. It is also the representative of the state to the Bureau of the Census for population estimating and for handling demographic and income statistics produced through the efforts of the Federal-State Cooperative Programs. In addition to statistics obtained from this source, area reports produced by the McKinley Area Council of Governments, the San Juan Council of Governments, the Middle Rio Grande Council of Governments and the New Mexico Energy Resources Board were also used. From these data a set of baseline figures were derived.

## POPULATION PROJECTIONS

In order to compute the impact for change in the baseline figures due to coal development, power plant activity and related activities, population was migrated on the basis of new jobs created and expected non-availability of certain occupations and/or labor skills within the area. The Construction Worker's Profile produced by Mountain West Research, Inc. under a project funded by the Old West Regional Commission was used extensively to determine characteristics of individuals migrating to construction sites. From this document it was determined that the overall household size for households migrating was 2.28. For other individuals migrating to the area due to indirect jobs, household size varied depending upon the year in which migration was taking place. A list of expected household sizes for newcomers to the area is on the following page. This list was calculated from the Bureau of the Census information taking into account the overall household size composition within the Southwest from which many of the construction workers or miners will migrate. In order to determine how many workers may migrate to the area, several factors (parameters) were estimated.

Because of the large number of developments and the impact of coal resources, in connection with low skill levels existing in the area, it is expected that about two of three individuals needed during the construction phase will be newcomers to the area. Of the jobs indirectly created by this type of development, approximately 50 percent of those jobs will be filled by individuals not previously existing in the area before the construction was undertaken. Thus, for the operation and because of the somewhat lower pay during some of the operation phases, and because of mine or training programs presently being conducted in the area and new ones expected in the future, it is assumed that approximately 40 percent of the individuals associated with the operational phase of the development will be individuals from the local area, and 60 percent will be newcomers to the area who were not previously there before the operation phase.





For the indirect jobs created by this type of activity, it is assumed that the percentage of migrants will be somewhat lower due to several factors including lower wages and the indirect jobs demand for lower skill levels and the fact that many of the indirect jobs will be presently existing in the community or population centers within the four-county area. Therefore, a parameter of one of two individuals for the indirect jobs will be persons not previously existing in the area before the new operation phase begins. These percentages are within a reasonable range of the findings of the Construction Worker's Profile.

Another factor should also be recognized. First, and foremost, with the relocation of 100 households into a region, an additional 19 to 20 workers will be available for jobs in secondary and tertiary sectors. Therefore, only 77 households would be expected to supply workers for 100 new positions.



## APPENDIX B

### AN OUTLINE OF INPUT-OUTPUT MODEL, AND PROJECTIONS METHODOLOGY

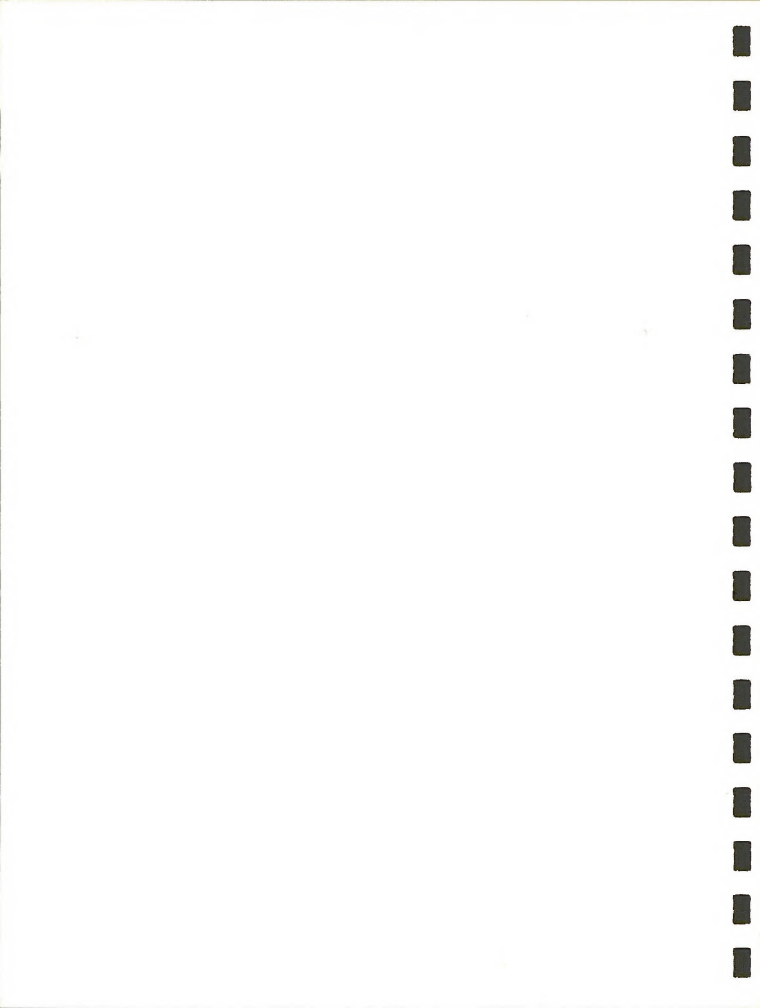
#### INPUT-OUTPUT MODEL

A static model in the form of a regional input-output model was constructed for the ES Region in northwestern New Mexico. This area includes McKinley and San Juan counties and adjacent areas. For this study Valencia County was divided into two portions; since the eastern portion of Valencia County is impacted heavily by the Albuquerque SMSA, the inclusion of eastern Valencia County could have affected the results of the input-output model significantly. It should be noted also that Sandoval County is impacted by the Albuquerque SMSA; Corrales and Rio Rancho Estates serve as "bedroom" communities for the Albuquerque SMSA. However, in terms of input-output model analysis, there exist few primary and secondary industries within these areas of Sandoval County. Therefore, it was decided that all of Sandoval County would be included in the model.

The original derivation process of the input-output modeling process is described in the published proceedings of the 1975 Conference of the Association of University Business and Economic Research. That paper is attached to this document in this appendix. The procedure described in that document was followed in general detail.

Subsequent to publication of that document, information on the agricultural sector for northwestern New Mexico has been improved and the credibility of the agricultural information is believed to be such that the variation experienced in the original modeling process has been decreased. Regardless of the extent of the accuracy of the agricultural information, the effect of the construction and operation of all coal-related developments in northwest New Mexico on the agricultural sector is believed to be less than one percent in terms of employment and income. Therefore, the accuracy of the agricultural sector in terms of indirect consequences is negligible to the overall modeling process.

This modeling process has been used to assess the economic impacts of the following activities and for the following agencies: San Juan Generating Units #1, #3, and #4 for Public Service Company of New Mexico; Proposed Waste Isolation Pilot Plant (WIPP), Carlsbad, New Mexico for Sandia Corporation, an agent of the Department of Energy; Social and Economic Assessment Study, Gallup-Navajo Indian Water Supply Project for the Bureau of Reclamation; Analysis of Multipliers for a Proposed Nuclear Power Plant at Cementon, New York, for Harbridge House, Inc., an agent of the Power Authority of the State of New York; and general economic impacts (an ongoing process) for the Bureau of Business and Economic Research, University of New Mexico.



During or about the same time this study was being conducted, the model was used for the following projects and agencies: Analysis of Two Sites for Nuclear or Fossil-Fuel Electric Generating Units for Harbridge House, Inc., an agent of New York State Electric and Gas Corporation; Analysis of the Economic Impacts of a Proposed Coal-Fired Generating Unit for Plains Electric Cooperative. Thus, the modeling process has been extensively used and is accepted as a tool to determine economic impact of proposed new facilities and developments.

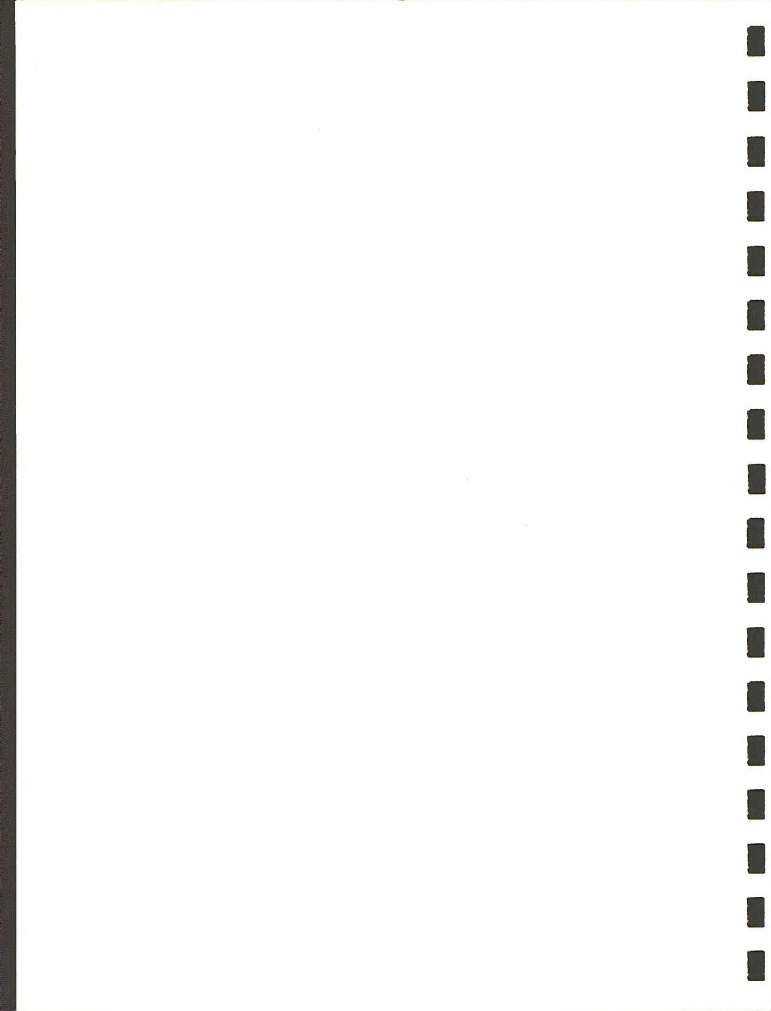
#### BASE MODEL

The regional modeling process adjusts a national model by means of location quotients and aggregating techniques. The national model, or base model, used in this process contains 407 economic categories or subsectors of the economy, 389 of which represent the private economy, and 18 of which represent activities mostly dealing with the public sector. The 389 identified sub-sectors were used in the modeling process; the government impact was computed after the private sector analysis.

The national base model, as used in the modeling process, represented an updated version of the 1967 National Input-Output Model constructed by the Department of Commerce, Bureau of Economic Analysis. Two important changes to the 1967 version have been made. First, the mining sectors have been expanded to 44 sub-sectors in the latest version. Second, Lawrence Berkeley Laboratories has mathematically updated the 1967 version to a 1972 version using a process called RAS. In simple terms, the RAS process updates the technical coefficients based upon 1972 data collected through the U.S. Bureau of the Census in the 1972 Census of Business.

As previously noted, discussion of the detailed modeling process and technical procedures can be found in this appendix. However, several important aspects of this particular model for northwestern New Mexico should be noted. First, detailed information on employment, by category, was determined from the files of the New Mexico Employment Security Commission under special permission obtained from the Energy Resources Board, State of New Mexico, through the Employment Security Commission's Director. Using this information, detailed location quotients for manufacturing were determined at the four-digit "SIC" code level which added considerable credibility and accuracy to the modeling process.

Secondly, because of the make up of the retail and wholesale sectors within the four-county area, a detailed analysis of the types of outlets located within the area was conducted. Basic information from the 1972 Census of Business was used with updated information from the employment files for this analysis.



Finally, once the location quotients had been determined, 1972 Census data were used to identify output per employee for those sub-sectors with location quotients computed through employment statistics. A total output figure was derived for these sectors. In turn, the total output figures were used to aggregate the 389 sub-sectors in the base model into the 44 private sub-sectors for the regional model.

Seven additional private sub-sectors were established for each of the seven types of operations to coal development. The coefficients for each of these were based on data supplied by the companies involved and specially modified national technical production process coefficients.

#### HOUSEHOLD COMPENSATION FOR LABOR AND PERSONAL CONSUMPTION WITHIN THE AREA

The figures for labor percentages, or coefficients, were determined through material produced in the 1967 National Input-Output Model. These figures represent the average percentage of cost going to labor from the technical production process (direct coefficients). Personal consumption figures were adjusted by weighting the location quotients of each of the 44 identified private sub-sectors in the regional model.

The final results of the determination of the location quotients and the aggregation process can be found on the following pages which list the direct coefficients. The results of the matrix inversion, or the aggregated direct, indirect, and induced effects of the modeling effort also follow.

#### OUTPUT MULTIPLIER

The volume of activity generated in the private sector due to a \$1 exogenous increase in a sub-sector can be determined through the input-output process. For example, considering power plant construction sector 45, we find the column sum of 1.45042 on page 6 of the table listing the direct, indirect, and induced effects. By subtracting from 1.45042 the amount of money flowing both directly and indirectly through the households (.23459), the residual is 1.21583, or approximately \$1.22 in total activity due to \$1 exogenous increase in power plant activity. Thus an additional \$.22 of indirect activity will be generated throughout the four-county area.

It should be noted at this point that the output multiplier is not of primary concern in determining overall impact of new developments within the area. The employment and income multipliers are believed to be of greater importance. And these multipliers may vary significantly from the 1.22 multiplicative multiplier noted for dollar output change due to an increase in activity in the power plant construction sub-sector of the four-county economy.

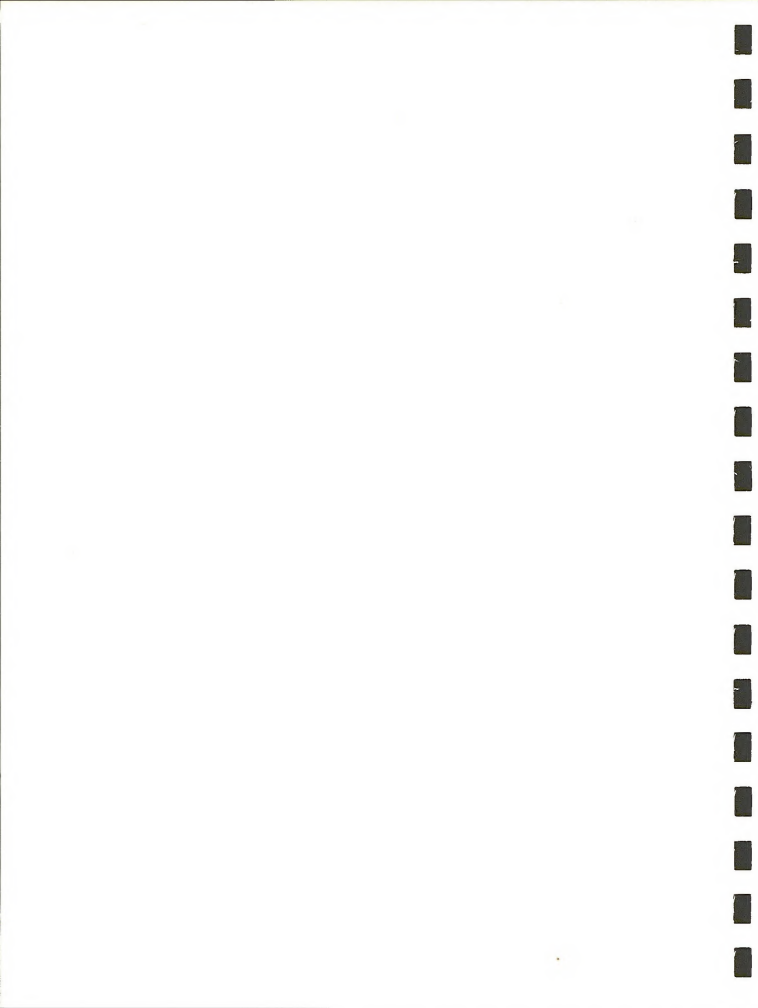




NORTHWEST NEW MEXICO RIM IMPACT AREA  
DIRECT COEFFICIENTS  
INDUSTRY PURCHASING

PAGE 1

		1	2	3	4	5	6	7	8	
LIVESTOCK & LIV. PROD.	1	0.31923	0.10685	0.00554	0.01192	0.00046	0.09103	0.00000	0.00000	1
GRAINS & SEED CROPS	2	0.10186	0.01146	0.00000	0.00000	0.00296	0.00000	0.00000	0.00000	2
FRUITS & NUT TREES	3	0.00000	0.00000	0.00000	0.00000	0.00375	0.00000	0.00000	0.00000	3
VEGETABLES	4	0.00063	0.00000	0.00000	0.00665	0.00070	0.00000	0.00000	0.00000	4
AG., FOR., & FISH SEV	5	0.00217	0.01289	0.08666	0.05894	0.00000	0.01483	0.00000	0.00000	5
OTHER AGRICULTURE PRO.	6	0.00000	0.00000	0.01706	0.02460	0.00038	0.11220	0.00000	0.00000	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.29496	0.00000	7
COAL BITUMINOUS	8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00022	0.00000	0.00000	8
CRUDE PETROLEUM	9	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	9
NAT. GAS & NAT. GAS LIQ	10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	10
CONST. SAND & GRAVEL	11	0.00000	0.00078	0.00036	0.00045	0.00000	0.00013	0.00000	0.00008	11
OTHER MINING	12	0.00000	0.00006	0.00003	0.00004	0.00000	0.00000	0.00000	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & REPAIR CONSTR.	18	0.00382	0.00935	0.00927	0.00640	0.00000	0.00241	0.01075	0.00530	18
E FOOD & KINDRED PROD.	19	0.00012	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	19
L PALER & WOOD PROD.	20	0.00001	0.00001	0.00002	0.00002	0.00000	0.00000	0.00270	0.00344	20
L PRINTING	21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	21
I PETROLEUM PROD.	22	0.00324	0.03281	0.01333	0.01223	0.00012	0.02183	0.00252	0.00787	22
N CONCRETE, GLASS, & STO	23	0.00000	0.00021	0.00063	0.00031	0.00000	0.00000	0.00000	0.00214	23
G FABRICATED METAL PROD.	24	0.00001	0.00000	0.00000	0.00000	0.00000	0.00774	0.00000	0.00000	24
MACHINERY PROD.	25	0.00003	0.00004	0.00005	0.00003	0.00000	0.00004	0.04603	0.01461	25
I ELECTRICAL PROD.	26	0.00021	0.00119	0.00083	0.00062	0.00000	0.00105	0.00002	0.00001	26
N MISC MANUFACTURING	27	0.00003	0.00023	0.00012	0.00012	0.00000	0.00031	0.00034	0.00002	27
D RAILROAD TRANSPORT	28	0.00265	0.00454	0.00241	0.00262	0.00015	0.00093	0.00434	0.00750	28
U LOCAL GROUND TRANSPORT	29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	29
S OTHER TRANSPORTATION	30	0.00000	0.00001	0.00008	0.00012	0.00002	0.00013	0.00029	0.00003	30
T COMMUNICATIONS	31	0.00127	0.00162	0.00198	0.00099	0.00000	0.00099	0.00127	0.00145	31
K ELECTRICAL UTILITIES	32	0.00089	0.00080	0.00180	0.00131	0.00001	0.00039	0.00853	0.01748	32
Y GAS UTILITIES	33	0.00001	0.00000	0.00000	0.00000	0.00003	0.00218	0.00551	0.00023	33
WATER & SEWER UTL.	34	0.00013	0.00506	0.00473	0.00640	0.00000	0.00020	0.00000	0.00062	34
WHOLESALE TRADE	35	0.01127	0.02164	0.01812	0.02037	0.00034	0.02001	0.00816	0.01306	35
RETAIL TRADE	36	0.00956	0.02292	0.01441	0.01027	0.00022	0.00749	0.00400	0.00484	36
FINANCE & INSURANCE	37	0.00241	0.00296	0.00325	0.00240	0.00005	0.00584	0.00623	0.00361	37
REAL ESTATE & HOMES	38	0.00817	0.05582	0.01233	0.02613	0.00149	0.00042	0.04710	0.02138	38
LONGING, P&R, & BUS SE	39	0.00033	0.01945	0.01304	0.00932	0.00000	0.00441	0.00631	0.00826	39
MISC & REPAIR SHR	40	0.00362	0.00490	0.00596	0.00390	0.00002	0.00556	0.00397	0.00486	40
MEDICAL SERVICES	41	0.00035	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
ENTER, EDUC, & NONPROF	42	0.00073	0.00072	0.00186	0.00060	0.00000	0.00070	0.00094	0.00125	42
PIPELINE TRANSPORT	43	0.00005	0.00056	0.00019	0.00020	0.00000	0.00035	0.00000	0.00003	43
MOTOR FREIGHT TRANSP.	44	0.01055	0.00816	0.00575	0.00547	0.00049	0.00524	0.01066	0.00422	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OIER	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OIER	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OIER	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OIER & STR LA RR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOUSEHOLD & P/C	52	0.03952	0.07061	0.07061	0.07061	0.26895	0.06685	0.25767	0.25000	52
*** COLUMN SUMS ***		0.52288	0.40104	0.29580	0.28840	0.28014	0.38172	0.72232	0.37229	



NORTHWEST NEW MEXICO BLM IMPACT AREA  
DIRECT COEFFICIENTS  
INDUSTRY PURCHASING

PAGE 2

		9	10	11	12	13	14	15	16	
LIVESTOCK & LIV. PROD.	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1
GRAINS & SEED CROPS	2	0.00000	0.00000	0.00000	0.00000	0.00012	0.00005	0.00005	0.00008	2
FRUITS & NUT TREES	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3
VEGETABLES	4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4
AGR., FOR., & FISH SEV	5	0.00000	0.00000	0.00000	0.00000	0.00139	0.00077	0.00070	0.00490	5
OTHER AGRICULTURE IFO.	6	0.00000	0.00000	0.00000	0.00000	0.00137	0.00146	0.00088	0.00005	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
COAL BITUMINOUS	8	0.00000	0.00000	0.00311	0.00000	0.00000	0.00000	0.00000	0.00000	8
CLAUDE IETROLEUM	9	0.00250	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	9
NAT. GAS & NAT. GAS LQ	10	0.00000	0.00656	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	10
CONST. SAND & GRAVEL	11	0.00000	0.00000	0.00551	0.00000	0.00103	0.00140	0.00240	0.02344	11
OTHER MINING	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & REPAIR CONSTR.	18	0.02719	0.02878	0.00422	0.01018	0.00025	0.00036	0.00032	0.00038	18
E FOOD & KINDRED PROD.	19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	19
L PALEK & WOOD PROD.	20	0.00000	0.00000	0.00000	0.00000	0.00121	0.00051	0.03044	0.00352	20
L PRINTING	21	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	21
I IETROLEUM PROD.	22	0.00426	0.00378	0.01755	0.01781	0.00436	0.00758	0.01270	0.04226	22
N CONCRETE, GLASS, & STO	23	0.00000	0.00000	0.02803	0.02863	0.03224	0.09774	0.02961	0.05590	23
G FABRICATED METAL PROD.	24	0.00000	0.00000	0.00000	0.00000	0.01474	0.02360	0.01580	0.02513	24
MACHINERY PROD.	25	0.00033	0.00086	0.00278	0.00937	0.00059	0.00021	0.00017	0.00021	25
I ELECTRICAL PROD.	26	0.00000	0.00000	0.00002	0.00000	0.00009	0.00014	0.00013	0.00012	26
N MISC MANUFACTURING	27	0.00006	0.00002	0.00000	0.00000	0.00081	0.00095	0.00049	0.00025	27
D RAILROAD TRANSPORT	28	0.00058	0.00061	0.00198	0.00000	0.01064	0.00770	0.00799	0.01098	28
U LOCAL GROUND TRANSPORT	29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	29
S OTHER TRANSPORTATION	30	0.00002	0.00002	0.00000	0.00665	0.00013	0.00021	0.00018	0.00011	30
R COMMUNICATIONS	31	0.00069	0.00074	0.00028	0.00000	0.00279	0.00416	0.00363	0.00429	31
K ELECTRICAL UTILITIES	32	0.00530	0.00203	0.01563	0.01448	0.00027	0.00042	0.00036	0.00042	32
Y GAS UTILITIES	33	0.00159	0.00735	0.00228	0.00000	0.00012	0.00017	0.00013	0.00018	33
WATER & SEWER UTL.	34	0.00035	0.00034	0.00629	0.00000	0.00021	0.00031	0.00022	0.00032	34
WHOLESALE TRADE	35	0.00300	0.00606	0.01227	0.01426	0.03748	0.03635	0.02918	0.03475	35
RETAIL TRADE	36	0.00380	0.00400	0.00584	0.00000	0.00541	0.04853	0.03402	0.04019	36
FINANCE & INSURANCE	37	0.00297	0.00322	0.00458	0.00903	0.00244	0.00363	0.00315	0.00375	37
REAL ESTATE & HOMES	38	0.12941	0.13687	0.01328	0.02417	0.00561	0.00819	0.00719	0.00850	38
LODGING, FTR., & BUS SE	39	0.00639	0.00677	0.00652	0.01301	0.00748	0.00687	0.00989	0.01315	39
MISC & REPAIR SER	40	0.00415	0.00937	0.00747	0.00700	0.02058	0.02941	0.01636	0.01825	40
MEDICAL SERVICES	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
ENTER, EDUC., & NONPROF	42	0.00057	0.00058	0.00042	0.00000	0.00159	0.00236	0.00208	0.00241	42
PIPELINE TRANSPORT	43	0.00022	0.00023	0.00006	0.00000	0.00004	0.00007	0.00017	0.00067	43
MOTOR FREIGHT TRANSP.	44	0.00060	0.00065	0.00415	0.01081	0.01594	0.02019	0.02044	0.06471	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OIER	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OIER	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OIER	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OIER & STR LA RR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOUSEHOLD & PIC	52	0.05865	0.05865	0.31124	0.31124	0.31413	0.31413	0.31413	0.31413	52

\*\*\* COLUMN SUMS \*\*\*

0.25262

0.33450

0.45352

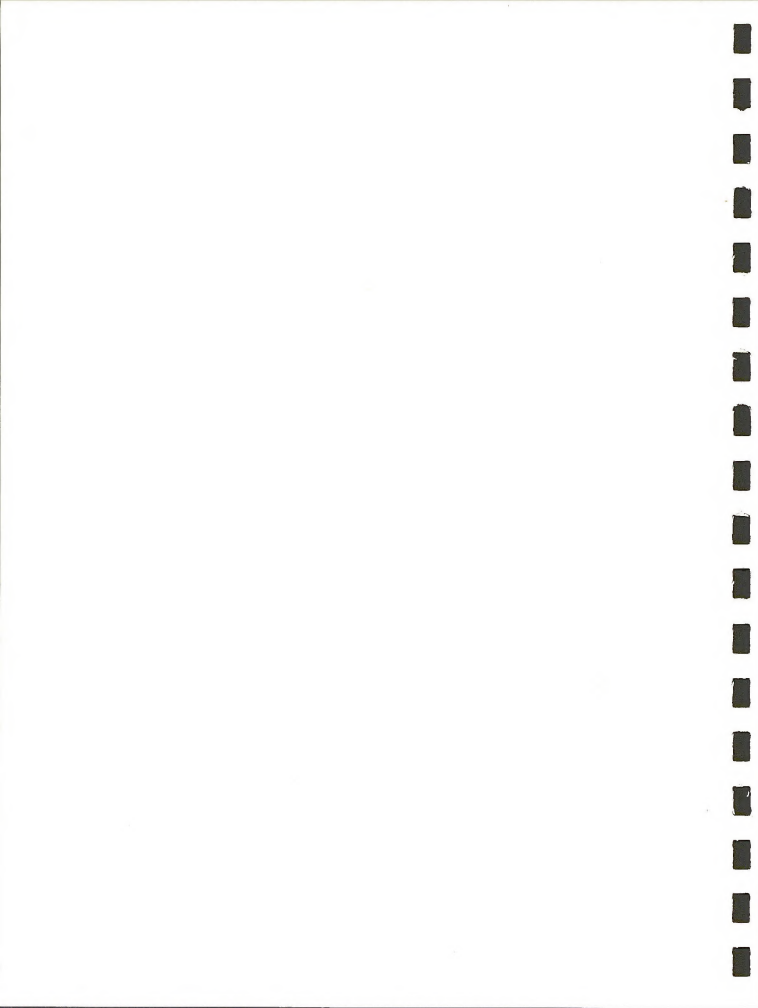
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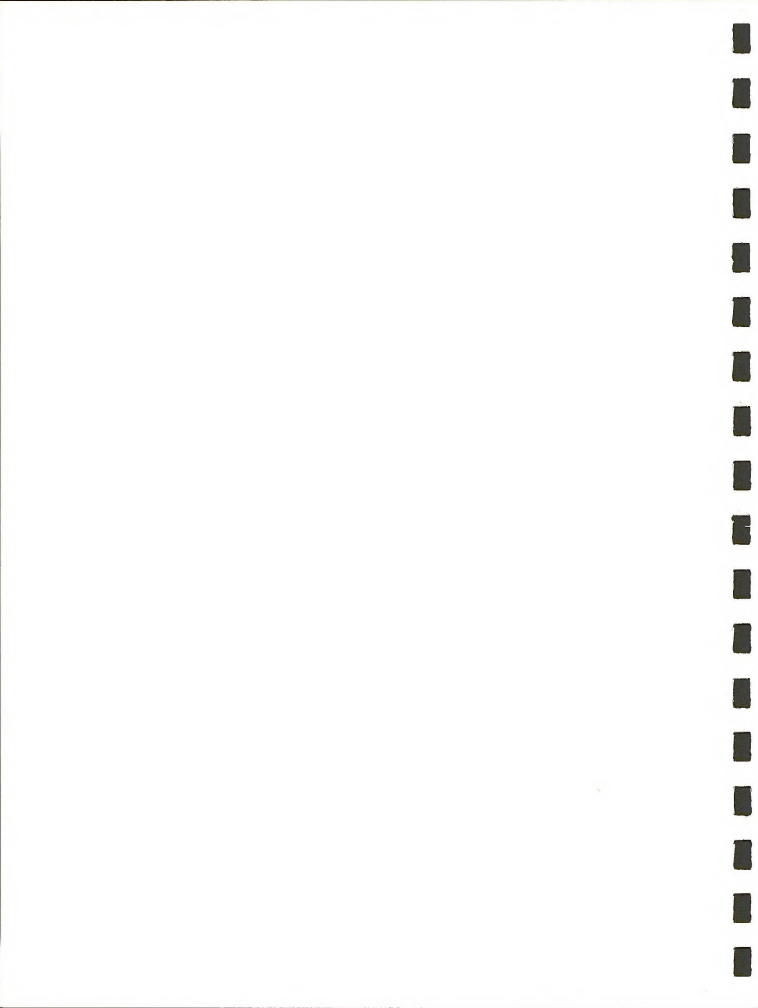


## NORTHWEST NEW MEXICO BIM IMPACT AREA

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DIRECT COEFFICIENTS  
INDUSTRY PURCHASING

		17	18	19	20	21	22	23	24	
LIVESTOCK & LIV. PROD.	1	0.00000	0.00000	0.37338	0.00000	0.00000	0.00000	0.00000	0.00000	1
GRAINS & SEED CROPS	2	0.00007	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	2
FRUITS & NUT TREES	3	0.00000	0.00000	0.00302	0.00000	0.00000	0.00000	0.00000	0.00000	3
VEGETABLES	4	0.00000	0.00000	0.00047	0.00000	0.00000	0.00000	0.00000	0.00000	4
AGR., FOR., & FISH SERV	5	0.00308	0.00060	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5
OTHER AGRICULTURE PRO.	6	0.00036	0.00015	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
COAL BITUMINOUS	8	0.00000	0.00000	0.00016	0.00024	0.00001	0.00046	0.00031	0.00022	8
CRUDE PETROLEUM	9	0.00000	0.00000	0.00000	0.00000	0.00000	0.46007	0.00000	0.00000	9
NAT. GAS & NAT. GAS LQ	10	0.00000	0.00000	0.00000	0.00000	0.00000	0.02351	0.00000	0.00000	10
CONST. SAND & GRAVEL	11	0.00493	0.00489	0.00000	0.00000	0.00000	0.00000	0.02118	0.00000	11
OTHER MINING	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00171	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & REPAIR CONSTR.	18	0.00030	0.00014	0.00140	0.00407	0.00349	0.01023	0.00314	0.00223	18
E FOOD & KINDRED PROD.	19	0.00000	0.00000	0.03586	0.00000	0.00000	0.00002	0.00000	0.00000	19
L PAPER & WOOD PROD.	20	0.02503	0.01115	0.00000	0.10162	0.00000	0.00002	0.00228	0.00062	20
L PRINTING	21	0.00000	0.00000	0.00088	0.00000	0.00613	0.00000	0.00000	0.00210	21
I PETROLEUM PROD.	22	0.02598	0.00891	0.00145	0.00847	0.00209	0.05511	0.00749	0.00400	22
N CONCRETE, GLASS, & STO	23	0.02630	0.00658	0.00000	0.00020	0.00000	0.00002	0.06090	0.00059	23
G FABRICATED METAL PROD.	24	0.02700	0.01363	0.00494	0.00004	0.00235	0.00061	0.00004	0.01363	24
MACHINERY PROD.	25	0.00029	0.00024	0.00000	0.00016	0.00000	0.00022	0.00349	0.00181	25
I ELECTRICAL PROD.	26	0.00014	0.00005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	26
N MISC MANUFACTURING	27	0.00045	0.00028	0.00057	0.00032	0.00011	0.00013	0.00192	0.00015	27
D RAILROAD TRANSPORT	28	0.00834	0.00539	0.00242	0.01293	0.00491	0.00106	0.02271	0.00716	28
U LOCAL GROUND TRANSPORT	29	0.00000	0.00000	0.00000	0.00000	0.00014	0.00000	0.00000	0.00000	29
S OTHER TRANSPORTATION	30	0.00007	0.00006	0.00003	0.00001	0.00003	0.00001	0.00003	0.00001	30
T COMMUNICATIONS	31	0.00338	0.00172	0.00258	0.00205	0.01186	0.00058	0.00481	0.00406	31
R ELECTRICAL UTILITIES	32	0.00034	0.00017	0.00151	0.00522	0.00239	0.00280	0.00401	0.00251	32
Y GAS UTILITIES	33	0.00015	0.00006	0.00117	0.00336	0.00079	0.01034	0.00636	0.00273	33
WATER & SEWER UTL.	34	0.00022	0.00011	0.00033	0.00035	0.00041	0.00133	0.00005	0.00010	34
WHOLESALE TRADE	35	0.03127	0.02627	0.01175	0.01850	0.01383	0.00475	0.01929	0.01620	35
RETAIL TRADE	36	0.04467	0.05460	0.00099	0.00252	0.00527	0.00039	0.00221	0.00809	36
FINANCE & INSURANCE	37	0.00294	0.00149	0.00110	0.00264	0.00413	0.00414	0.00261	0.00247	37
REAL ESTATE & HOMES	38	0.00685	0.00380	0.00554	0.00635	0.01865	0.01726	0.02151	0.01346	38
LODGING, FER., & BUS SE	39	0.01908	0.01030	0.00925	0.00458	0.01861	0.00768	0.00967	0.00669	39
MISC. & REPAIR SERV	40	0.01651	0.00457	0.00228	0.00722	0.00077	0.00466	0.00237	0.00237	40
MEDICAL SERVICES	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
ENTER. ENCL. & NONIMP	42	0.00194	0.00099	0.00078	0.00063	0.00365	0.00031	0.00156	0.00114	42
PIPERLINE TRANSPORT	43	0.00044	0.00011	0.00001	0.00014	0.00004	0.02202	0.00008	0.00004	43
MOTOR FREIGHT TRANSP.	44	0.02431	0.01873	0.01604	0.00763	0.00674	0.00578	0.07229	0.01202	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OPER	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OPER	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OPER	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OPER & STR LK RR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOUSEHOLD & P/C	52	0.31413	0.50288	0.14737	0.24083	0.37181	0.08401	0.30667	0.31351	52
*** COLUMN SUMS ***		0.58855	0.67790	0.62031	0.43006	0.48518	0.71362	0.58098	0.41789	

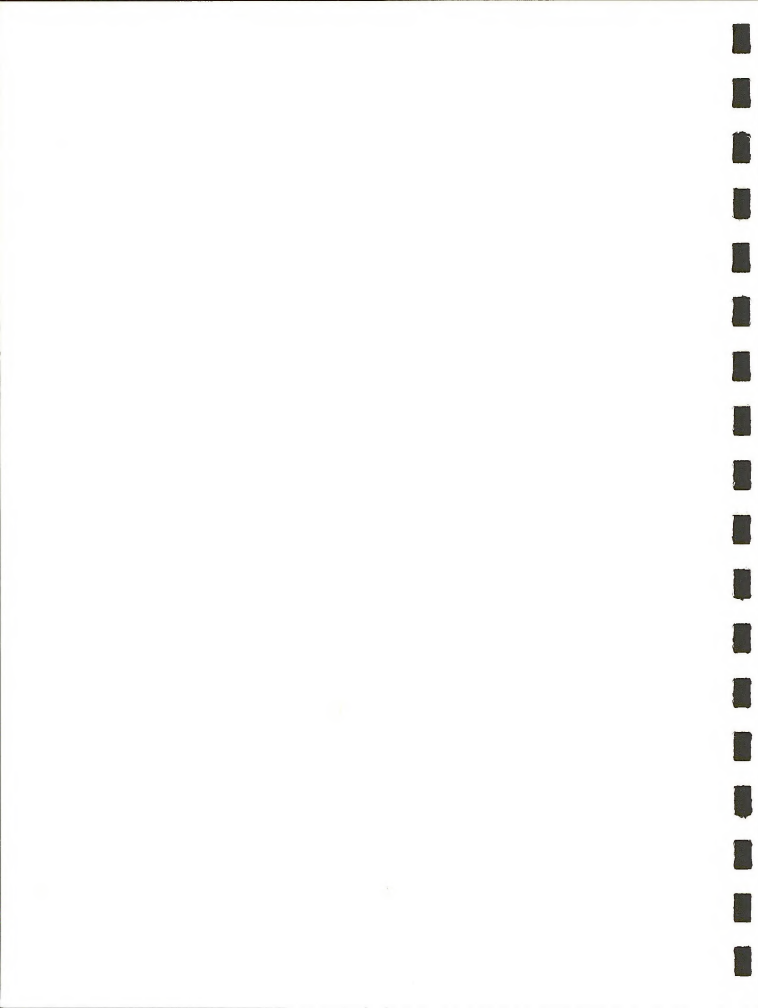


NORTHWEST NEW MEXICO RLM IMPACT AREA  
DIRECT COEFFICIENTS  
INDUSTRY PURCHASING

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		25	26	27	28	29	30	31	32	
LIVESTOCK & LIV. PROD.	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1
GRAINS & SEED CROPS	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2
FRUITS & NUT TREES	3	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	3
VEGETABLES	4	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	4
AGR., FOR., & FISH SEV	5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5
OTHER AGRICULTURE PRO.	6	0.00000	0.00000	0.00000	0.00012	0.00000	0.00000	0.00000	0.00000	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
COAL BITUMINOUS	8	0.00021	0.00021	0.00014	0.00002	0.00000	0.00000	0.00000	0.04392	8
CRUDE PETROLEUM	9	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00059	9
NAT. GAS & NAT. GAS LQ	10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00361	10
CONST. SAND & GRAVEL	11	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	11
OTHER MINING	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & REPAIR CONSTR.	18	0.00499	0.00341	0.00158	0.00431	0.00128	0.00016	0.01466	0.02801	18
E FOOD & KINDRED PROD.	19	0.00000	0.00000	0.00004	0.00002	0.00000	0.00004	0.00000	0.00001	19
L PAPER & WOOD PROD.	20	0.01999	0.00177	0.00334	0.00000	0.00000	0.00000	0.00000	0.00004	20
L PRINTING	21	0.00000	0.00000	0.00014	0.00024	0.00011	0.00000	0.00000	0.00000	21
I PETROLEUM PROD.	22	0.01013	0.00124	0.00369	0.01700	0.01937	0.00568	0.00201	0.01204	22
N CONCRETE, GLASS, & STO	23	0.00000	0.00052	0.00626	0.00000	0.00000	0.00000	0.00000	0.00000	23
G FABRICATED METAL PROD.	24	0.00391	0.00000	0.00011	0.00001	0.00000	0.00000	0.00000	0.00000	24
M MACHINERY PROD.	25	0.00268	0.00030	0.00025	0.00003	0.00015	0.00000	0.00000	0.00000	25
I ELECTRICAL PROD.	26	0.00050	0.00146	0.00000	0.00000	0.00015	0.00007	0.00003	0.00002	26
N MISC. MANUFACTURING	27	0.00068	0.00160	0.01551	0.00015	0.00029	0.00002	0.00000	0.00002	27
D RAILROAD TRANSPORT	28	0.01017	0.00603	0.00336	0.02719	0.00048	0.00007	0.00016	0.01509	28
U LOCAL GROUND TRANSPORT	29	0.00000	0.00000	0.00000	0.00307	0.00255	0.00000	0.00000	0.00000	29
S OTHER TRANSPORTATION	30	0.00017	0.00000	0.00014	0.00113	0.00022	0.00144	0.00002	0.00001	30
T COMMUNICATIONS	31	0.00757	0.00340	0.00038	0.00015	0.00289	0.00082	0.01059	0.00221	31
K ELECTRICAL UTILITIES	32	0.00534	0.00609	0.00265	0.00240	0.00222	0.00007	0.00265	0.03604	32
Y GAS UTILITIES	33	0.00323	0.00374	0.00095	0.00066	0.00055	0.00005	0.00107	0.03353	33
WATER & SEWER UTL.	34	0.00047	0.00079	0.00023	0.00115	0.00249	0.00061	0.00087	0.00068	34
WHOLESALE TRADE	35	0.03822	0.02099	0.02600	0.00943	0.01598	0.00150	0.00223	0.00457	35
RETAIL TRADE	36	0.02126	0.00372	0.00603	0.00069	0.00795	0.00004	0.00463	0.00168	36
FINANCE & INSURANCE	37	0.00526	0.00342	0.00305	0.00144	0.00411	0.00042	0.00232	0.00276	37
REAL ESTATE & HOMES	38	0.02935	0.01459	0.01253	0.02634	0.00712	0.00187	0.01331	0.00190	38
LODGING, FRM., & HOUS SE	39	0.00273	0.00580	0.00698	0.00231	0.00244	0.00035	0.00638	0.00192	39
MISC. & REPAIR SER	40	0.00566	0.00248	0.00224	0.00182	0.02112	0.00013	0.00992	0.00024	40
MEDICAL SERVICES	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
ENTER. ENCL. & NONHOF	42	0.00234	0.00117	0.00188	0.00169	0.00190	0.00004	0.05005	0.00055	42
PIPELINE TRANSPORT	43	0.00001	0.00000	0.00000	0.00024	0.00036	0.00013	0.00004	0.00004	43
MOTOR FREIGHT TRANSP.	44	0.01489	0.00937	0.00719	0.00472	0.00677	0.00072	0.00129	0.00623	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OVER	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OVER	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OVER	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OVER & STN LK RR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOUSEHOLD & P/C	52	0.38574	0.31012	0.27774	0.39619	0.39619	0.39619	0.33547	0.13141	52
*** COLUMN SUMS ***		0.65552	0.48283	0.48724	0.54207	0.49672	0.41167	0.45286	0.32988	

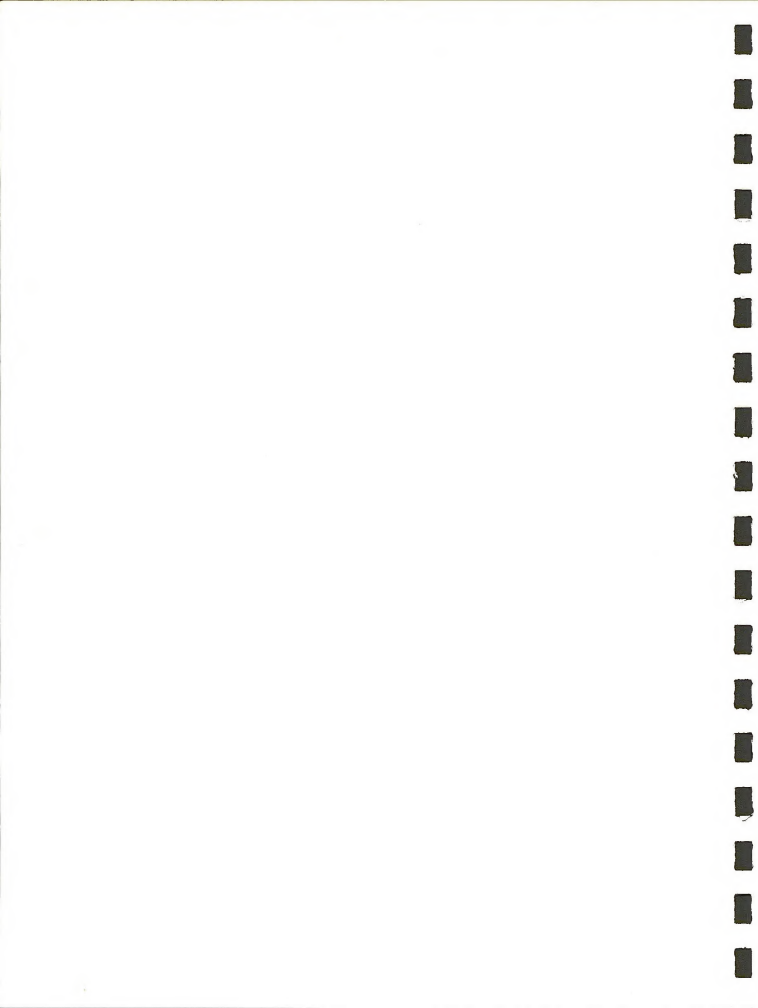




NORTHWEST NEW MEXICO BLM IMPACT AREA  
DIRECT COEFFICIENTS  
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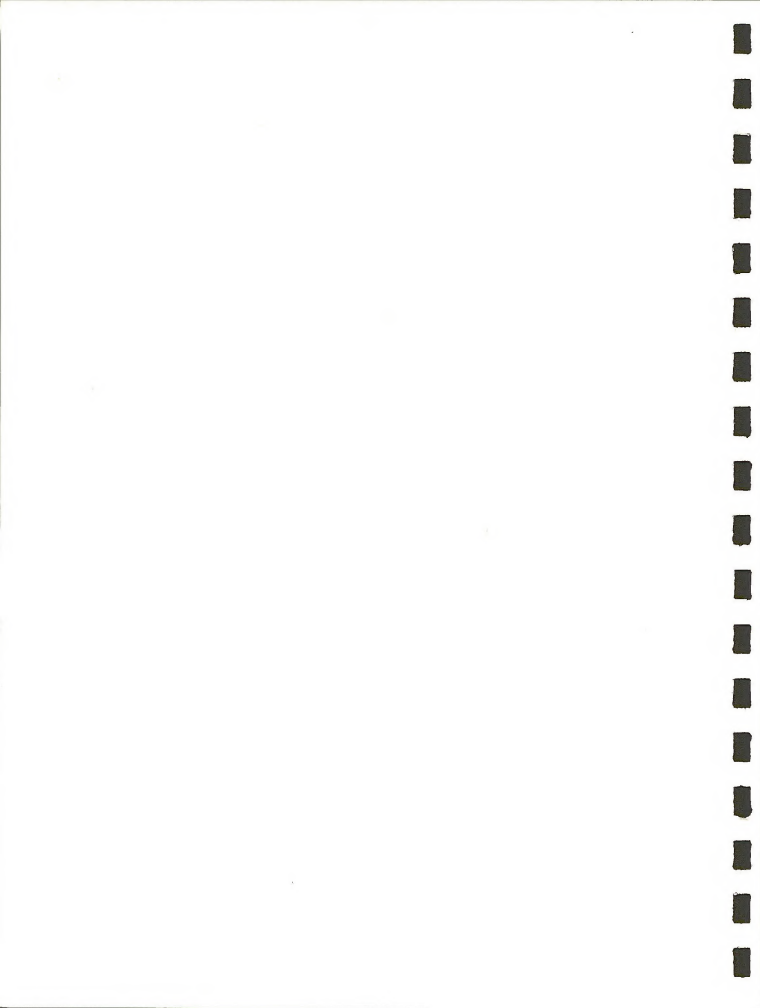
		33	34	35	36	37	38	39	40
LIVESTOCK & LIV. PROD.	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00577	0.00000	0.00000
GRAINS & SEED CROPS	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00138	0.00000	0.00000
FRUITS & NUT TREES	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00040	0.00000	0.00000
VEGETABLES	4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00018	0.00000	0.00000
AGR., FOL., & FISH SEV	5	0.00000	0.00000	0.00117	0.00000	0.00000	0.00062	0.00000	0.00000
OTHER AGRICULTURE PRO.	6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00017	0.00003	0.00000
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
COAL BITUMINOUS	8	0.00025	0.00288	0.00001	0.00000	0.00000	0.00007	0.00001	0.00000
CRUDE PETROLEUM	9	0.02381	0.00000	0.00001	0.00000	0.00000	0.00013	0.00000	0.00000
NAT. GAS & NAT. GAS LIQ	10	0.16255	0.00000	0.00004	0.00000	0.00000	0.00082	0.00000	0.00000
CONST. SAND & GEMMEL	11	0.00000	0.00000	0.00001	0.00000	0.00000	0.00004	0.00001	0.00000
OTHER MINING	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
S MAIN. & REPAIR CONSTR.	18	0.01943	0.00484	0.00094	0.00280	0.00414	0.04596	0.00506	0.00272
E FOOD & KINDRED PROD.	19	0.00000	0.00000	0.00209	0.00000	0.00000	0.00026	0.00000	0.00000
L PAPER & WOOD PROD.	20	0.00000	0.00000	0.00045	0.00002	0.00000	0.00007	0.00002	0.00000
L PRINTING	21	0.00000	0.00000	0.00029	0.00026	0.00217	0.00009	0.00650	0.00008
I PETROLEUM PROD.	22	0.00076	0.00334	0.00057	0.00516	0.00220	0.00408	0.00385	0.01744
N CONCRETE, GLASS, & STO	23	0.00000	0.00000	0.00067	0.00002	0.00000	0.00007	0.00045	0.00000
G FABRICATED METAL PROD.	24	0.00000	0.00000	0.00055	0.00037	0.00000	0.00004	0.00023	0.00002
MACHINERY PROD.	25	0.00000	0.00000	0.00022	0.00002	0.00000	0.00011	0.00080	0.00882
I ELECTRICAL PROD.	26	0.00000	0.00000	0.00012	0.00005	0.00001	0.00001	0.00006	0.00018
N MISC MANUFACTURING	27	0.00000	0.00004	0.00109	0.00045	0.00009	0.00011	0.00494	0.00036
D RAILROAD TRANSPORT	28	0.00009	0.00125	0.00032	0.00031	0.00021	0.00279	0.00122	0.00416
U LOCAL GROUND TRANSPORT	29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00015	0.00005	0.00000
S OTHER TRANSPORTATION	30	0.00000	0.00002	0.00000	0.00005	0.00001	0.00007	0.00039	0.00032
T COMMUNICATIONS	31	0.00186	0.00391	0.01036	0.00494	0.01714	0.00106	0.01588	0.00863
R ELECTRICAL UTILITIES	32	0.00129	0.01386	0.00189	0.00707	0.00676	0.00065	0.00169	0.00435
Y GAS UTILITIES	33	0.36157	0.01650	0.00046	0.00314	0.00265	0.00044	0.00131	0.00118
WATER & SEWER UTIL.	34	0.00046	0.00064	0.00118	0.00158	0.00321	0.00114	0.00058	0.00083
WHOLESALE TRADE	35	0.00046	0.00340	0.01144	0.00420	0.00475	0.00229	0.01065	0.00709
RETAIL TRADE	36	0.00155	0.00327	0.01557	0.00381	0.00746	0.00731	0.00579	0.00349
FINANCE & INSURANCE	37	0.00243	0.00344	0.00483	0.00636	0.00691	0.01085	0.00442	0.00047
REAL ESTATE & HOMES	38	0.00379	0.01389	0.02374	0.03928	0.04259	0.01550	0.02804	0.03641
LONGING, IER., & BUS SE	39	0.00259	0.00524	0.00658	0.00443	0.03522	0.00307	0.00676	0.00375
MISC & REPAIR SER	40	0.00073	0.00766	0.02365	0.00769	0.01447	0.00415	0.01506	0.01181
MEDICAL SERVICES	41	0.00000	0.00000	0.00000	0.00000	0.00003	0.00029	0.00000	0.00000
ENTER, EDUC., & NONPROF	42	0.00052	0.00104	0.00203	0.00322	0.01491	0.00183	0.00422	0.00186
PIPELINE TRANSPORT	43	0.00001	0.00009	0.00015	0.00009	0.00004	0.00003	0.00006	0.00023
MOTOR FREIGHT TRANSP.	44	0.00010	0.00101	0.01526	0.00128	0.00127	0.00235	0.00537	0.00588
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
POWER PLANT OVR	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SURFACE COAL OVR	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
UNDERGROUND COAL OVR	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
COAL OVR & STR LK KK	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
HOUSEHOLD & PIC	52	0.13141	0.13141	0.42734	0.42734	0.40776	0.01660	0.31359	0.26024
*** COLUMN SUMS ***		0.69434	0.27772	0.56104	0.52404	0.63629	0.13095	0.43705	0.50755



NORTHWEST NEW MEXICO RLM IMPACT AREA  
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		41	42	43	44	45	46	47	48	
LIVESTOCK & LIV. PROD.	1	0.00009	0.00152	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1
GRAINS & SEED CROPS	2	0.00000	0.00178	0.00000	0.00108	0.00001	0.00000	0.00005	0.00000	2
FRUITS & NUT TREES	3	0.00066	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3
VEGETABLES	4	0.00029	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4
AGR., FOR., & FISH SEV	5	0.00000	0.00028	0.00000	0.00000	0.00011	0.00000	0.00162	0.00000	5
OTHER AGRICULTURE PRO.	6	0.00000	0.00012	0.00000	0.00000	0.00014	0.00000	0.00063	0.00000	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
COAL BITUMINOUS	8	0.00008	0.00002	0.00000	0.00017	0.00000	0.00000	0.00000	0.00000	8
CRUDE PETROLEUM	9	0.00000	0.00000	0.00361	0.00000	0.00000	0.00000	0.00000	0.00000	9
NAT. GAS & NAT. GAS LQ	10	0.00000	0.00000	0.02236	0.00000	0.00000	0.00331	0.00000	0.00000	10
CONST. SAND & GRAVEL	11	0.00000	0.00000	0.00000	0.00000	0.00126	0.00000	0.00712	0.00002	11
OTHER MINING	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & REPAIR CONSTR.	18	0.00813	0.02897	0.05449	0.00253	0.00005	0.02572	0.00028	0.00142	18
E FOOD & KINDRED PROD.	19	0.00496	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	19
L PAVER & WOOD PROD.	20	0.00000	0.00000	0.00000	0.00002	0.00175	0.00004	0.01056	0.00092	20
L KENTING	21	0.00009	0.00472	0.00012	0.00024	0.00000	0.00000	0.00000	0.00000	21
I PETROLEUM PROD.	22	0.00602	0.00839	0.02063	0.04053	0.00194	0.00986	0.01612	0.00211	22
N CONCRETE, GLASS, & STO	23	0.00000	0.00000	0.00000	0.00000	0.00381	0.00000	0.03426	0.00057	23
G FABRICATED METAL PROD.	24	0.00000	0.00000	0.00000	0.00000	0.00857	0.00000	0.01828	0.00000	24
MACHINEERY PROD.	25	0.00000	0.00000	0.00055	0.00008	0.00001	0.00000	0.00015	0.00049	25
I ELECTRICAL PROD.	26	0.00010	0.00014	0.00000	0.00066	0.00000	0.00000	0.00010	0.00000	26
N MISC MANUFACTURING	27	0.00286	0.00366	0.00000	0.00007	0.00002	0.00001	0.00043	0.00001	27
D RAILROAD TRANSPORT	28	0.00088	0.00092	0.00138	0.00663	0.00123	0.01385	0.00698	0.00201	28
U LOCAL GROUND TRANSPORT	29	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	29
S OTHER TRANSPORTATION	30	0.00004	0.00011	0.00000	0.00057	0.00003	0.00001	0.01636	0.00001	30
T COMMUNICATIONS	31	0.01073	0.01175	0.00873	0.00988	0.00056	0.00703	0.00316	0.00039	31
K ELECTRICAL UTILITIES	32	0.01154	0.02522	0.03920	0.00036	0.00011	0.00000	0.00033	0.00947	32
Y GAS UTILITIES	33	0.00476	0.00912	0.01655	0.00037	0.00002	0.03078	0.00012	0.00006	33
WATER & SEWER UTIL.	34	0.00735	0.00758	0.00022	0.00021	0.00003	0.00062	0.00022	0.00017	34
WHOLESALE TRADE	35	0.01946	0.00983	0.00889	0.02682	0.00248	0.00231	0.02568	0.00193	35
RETAIL TRADE	36	0.01722	0.01079	0.00235	0.01921	0.00521	0.00154	0.03199	0.00129	36
FINANCE & INSURANCE	37	0.00445	0.00169	0.01075	0.00380	0.00048	0.00260	0.00275	0.00097	37
REAL ESTATE & HOMES	38	0.06986	0.06784	0.03669	0.01056	0.00064	0.00100	0.00613	0.00330	38
LONGING, IER, & BUS SE	39	0.00747	0.02029	0.01173	0.00382	0.00173	0.00103	0.00274	0.00004	39
MISC & REPAIR SER	40	0.01699	0.02394	0.00420	0.04583	0.00248	0.00366	0.00394	0.00381	40
MEDICAL SERVICES	41	0.01180	0.00000	0.00000	0.00000	0.00015	0.00001	0.00024	0.00001	41
ENTER, EDUC, & REPROF	42	0.00120	0.06968	0.00217	0.00016	0.00000	0.00000	0.00000	0.00000	42
PIPELINE TRANSPORT	43	0.00011	0.00015	0.00187	0.00076	0.00003	0.00004	0.00004	0.00001	43
WATER FREIGHT TRANSP.	44	0.00486	0.00488	0.01117	0.15549	0.00314	0.00572	0.00498	0.00113	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OIER	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OIER	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OIER	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OIER & STR LK RR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOUSEHOLD & P/C	52	0.48521	0.44155	0.39619	0.39619	0.17622	0.09765	0.27965	0.09020	52
*** COLUMN SUMS ***		0.69721	0.75497	0.65385	0.72604	0.21221	0.93714	0.47491	0.12034	



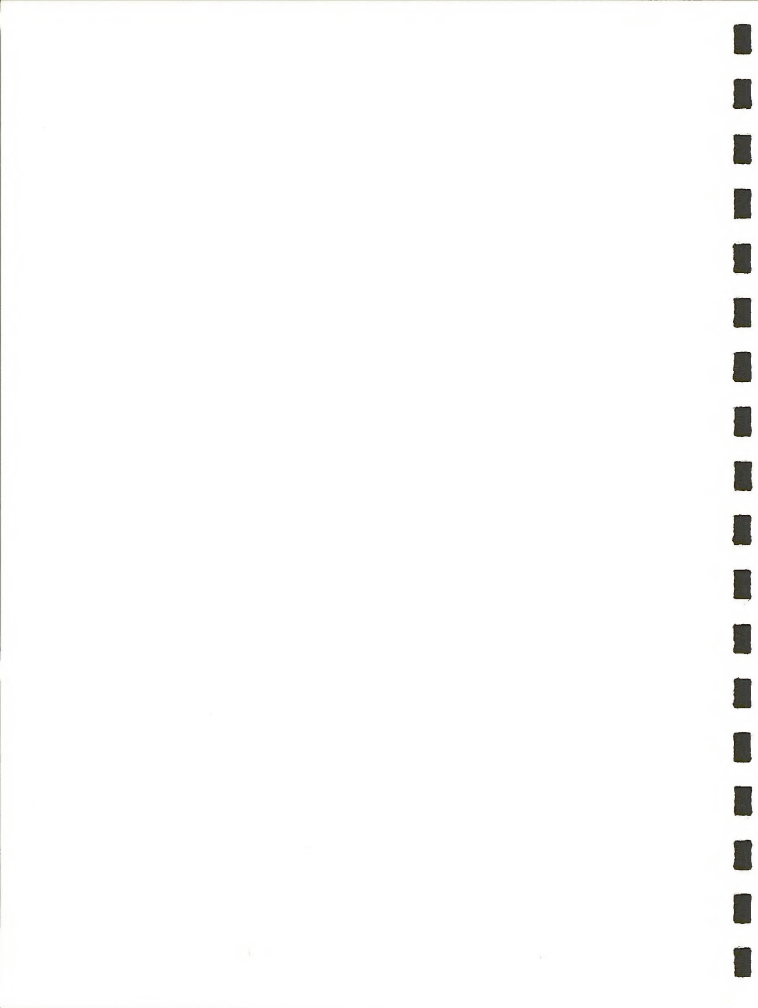
## NORTHWEST NEW MEXICO HLM IMPACT AREA

PAGE 7

## DIRECT COEFFICIENTS

## INDUSTRY PURCHASING

		49	50	51	52	*** ROW SUMS ***
LIVESTOCK & LIV. PROD.	1	0.00000	0.00000	0.00000	0.00079	1 0.91658
GRAINS & SEED CROPS	2	0.00000	0.00000	0.00000	0.00018	2 0.12116
FRUITS & NUT TREES	3	0.00000	0.00000	0.00000	0.00206	3 0.00992
VEGETABLES	4	0.00000	0.00000	0.00000	0.00092	4 0.00094
AGR., FOR., & FISH SEV	5	0.00000	0.00490	0.00000	0.00029	5 0.19593
OTHER AGRICULTURE PRO.	6	0.00000	0.00005	0.00000	0.00000	6 0.15991
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	7 0.29497
COAL BITUMINOUS	8	0.00000	0.00000	0.00000	0.00000	8 0.05275
CRUDE PETROLEUM	9	0.00000	0.00000	0.00000	0.00000	9 0.49072
NAT. GAS & NAT. GAS LIQ	10	0.00000	0.00000	0.00000	0.00000	10 0.26847
CONST. SAND & GRAVEL	11	0.00002	0.00234	0.00000	0.00000	11 0.07743
OTHER MINING	12	0.00000	0.00000	0.00000	0.00000	12 0.00184
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	13 0.00000
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	14 0.00000
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	15 0.00000
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	16 0.00000
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	17 0.00000
S MAIN. & REPAIR CONSTR.	18	0.00110	0.00038	0.00020	0.00000	18 0.50653
E FOOD & KINDRED PROD.	19	0.00000	0.00000	0.00000	0.02581	19 0.07046
L PAWER & WOOD PROD.	20	0.00735	0.00328	0.00000	0.00156	20 0.29980
L PRINTING	21	0.00000	0.00000	0.00000	0.00012	21 0.02437
I PETROLEUM PROD.	22	0.00260	0.00423	0.00008	0.02146	22 0.56824
N CONCRETE, GLASS, & STO	23	0.00440	0.00632	0.00000	0.00002	23 0.37739
G FABRICATED METAL PROD.	24	0.00000	0.02739	0.00000	0.00003	24 0.20850
MACHINERY PROD.	25	0.00313	0.00009	0.00000	0.00002	25 0.13948
I ELECTRICAL PROD.	26	0.00000	0.00000	0.00000	0.00044	26 0.08873
N MISC MANUFACTURING	27	0.00001	0.00018	0.00000	0.00837	27 0.14872
D RAILROAD TRANSPORT	28	0.00155	0.01098	0.00013	0.00000	28 0.24999
U LOCAL GROUND TRANSPORT	29	0.00000	0.00000	0.00001	0.00565	29 0.01162
S OTHER TRANSPORTATION	30	0.00001	0.00011	0.00001	0.00510	30 0.03459
T COMMUNICATIONS	31	0.00030	0.00429	0.00002	0.01122	31 0.21999
R ELECTRICAL UTILITIES	32	0.01461	0.00086	0.00002	0.00795	32 0.29413
Y GAS UTILITIES	33	0.00005	0.00018	0.00000	0.00940	33 0.54717
WATER & SEWER UTL.	34	0.00013	0.00032	0.00001	0.00271	34 0.06456
WHOLESALE TRADE	35	0.00013	0.01916	0.00001	0.03146	35 0.79872
RETAIL TRADE	36	0.00100	0.04005	0.00000	0.17329	36 0.87265
FINANCE & INSURANCE	37	0.00075	0.00373	0.00001	0.01827	37 0.25936
REAL ESTATE & HOMES	38	0.00255	0.00489	0.00007	0.14917	38 1.27093
LONGING, PER., & BUS SE	39	0.00003	0.01301	0.00001	0.02260	39 0.43309
MISC & REPAIR SER	40	0.02434	0.02079	0.00002	0.01935	40 0.48704
MEDICAL SERVICES	41	0.00001	0.00001	0.00000	0.03014	41 0.04334
ENTER, EDUC., & NONPROF	42	0.00000	0.00000	0.00000	0.02947	42 0.22010
LIFELINE TRANSPORT	43	0.00001	0.00062	0.00000	0.00048	43 0.03132
WATER FLIGHT TRANSP.	44	0.00087	0.06471	0.00002	0.00649	44 0.69932
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	45 0.00000
POWER PLANT OVER	46	0.00000	0.00000	0.00000	0.00000	46 0.00000
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	47 0.00000
SURFACE COAL OVER	48	0.00000	0.00000	0.92616	0.00000	48 1.66150
UNDERGROUND COAL OVER	49	0.00000	0.00000	0.06921	0.00000	49 0.06921
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	50 0.00000
COAL OVER & STR LK RR	51	0.00000	0.00000	0.00000	0.00000	51 0.00000



NORTHWEST NEW MEXICO DUM IMPACT AREA  
DIRECT, INDIRECT, AND INDUCED COEFFICIENTS  
INDUSTRY PURCHASING

PAGE 1

		1	2	3	4	5	6	7	8	
LIVESTOCK & LIV. PROD.	1	1.49604	0.16534	0.01434	0.02503	0.00729	0.15618	0.01059	0.00668	1
GRAINS & SEED CROPS	2	0.15429	1.02886	0.00186	0.00289	0.00392	0.01626	0.00150	0.00091	2
FRUITS & NUT TREES	3	0.00035	0.00049	1.00071	0.00060	0.00050	0.00043	0.00126	0.00081	3
VEGETABLES	4	0.00110	0.00031	0.00025	1.00091	0.00104	0.00027	0.00056	0.00036	4
AGR., FOR., & FISH SEV	5	0.00545	0.01385	0.08720	0.06004	1.00067	0.01743	0.00052	0.00032	5
OTHER AGRICULTURE PRO.	6	0.00006	0.00005	0.01929	0.02795	0.00056	1.12641	0.00009	0.00006	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.41837	0.00000	7
COAL BITUMINOUS	8	0.00019	0.00023	0.00024	0.00022	0.00019	0.00042	0.00094	1.00103	8
CRUDE PETROLEUM	9	0.00756	0.02009	0.00965	0.00909	0.00454	0.01530	0.01070	0.00926	9
NAT. GAS & NAT. GAS LIQ	10	0.00099	0.00196	0.00123	0.00117	0.00128	0.00210	0.00452	0.00198	10
CONST. SAND & GRAVEL	11	0.00019	0.00091	0.00046	0.00053	0.00003	0.00020	0.00015	0.00020	11
OTHER MINING	12	0.00001	0.00006	0.00003	0.00004	0.00000	0.00000	0.00000	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & REPAIR CONSTR.	18	0.01102	0.01759	0.01355	0.01127	0.00424	0.00743	0.02724	0.01235	18
F FOOD & KINDRED PROD.	19	0.00413	0.00506	0.00480	0.00447	0.00505	0.00439	0.01498	0.00973	19
L LATER & WOOD PROD.	20	0.00044	0.00060	0.00053	0.00048	0.00066	0.00042	0.00715	0.00500	20
L FERTILIZING	21	0.00016	0.00030	0.00024	0.00020	0.00021	0.00020	0.00049	0.00032	21
I PETROLEUM PROD.	22	0.01620	0.04326	0.02068	0.01949	0.00950	0.03275	0.02188	0.01959	22
N CONCRETE, GLASS, & STC	23	0.00016	0.00045	0.00083	0.00008	0.00009	0.00012	0.00031	0.00245	23
G FABRICATED METAL PROD.	24	0.00024	0.00036	0.00042	0.00045	0.00016	0.00073	0.00083	0.00036	24
MACHINEERY PROD.	25	0.00020	0.00025	0.00022	0.00018	0.00012	0.00024	0.06852	0.01549	25
I ELECTRICAL PROD.	26	0.00065	0.00149	0.00104	0.00083	0.00019	0.00144	0.00039	0.00022	26
N MISC. MANUFACTURING	27	0.00163	0.00232	0.00205	0.00190	0.00337	0.00211	0.00628	0.00374	27
D RAILROAD TRANSPORT	28	0.00538	0.00607	0.00312	0.00338	0.00065	0.00214	0.00866	0.00900	28
U LOCAL GROUND TRANSPORT	29	0.00084	0.00107	0.00101	0.00094	0.00190	0.00092	0.00318	0.00207	29
S OTHER TRANSPORTATION	30	0.00077	0.00099	0.00102	0.00099	0.00175	0.00098	0.00330	0.00190	30
T COMMUNICATIONS	31	0.00524	0.00597	0.00558	0.00428	0.00508	0.00066	0.01184	0.00772	31
K ELECTRICAL UTILITIES	32	0.00370	0.00405	0.00452	0.00383	0.00399	0.00307	0.01999	0.02285	32
Y GAS UTILITIES	33	0.00321	0.00462	0.00403	0.00379	0.00611	0.00758	0.02371	0.00829	33
WATER & SEWER UTL.	34	0.00171	0.00624	0.00560	0.00727	0.00137	0.00114	0.00246	0.00219	34
WHOLESALE TRADE	35	0.02773	0.03371	0.02725	0.02923	0.01335	0.03268	0.03793	0.02893	35
RETAIL TRADE	36	0.04587	0.06114	0.04836	0.04204	0.06067	0.04089	0.10966	0.07131	36
FINANCE & INSURANCE	37	0.00863	0.00974	0.00861	0.00760	0.00816	0.01214	0.02455	0.01328	37
REAL ESTATE & HOMES	38	0.04937	0.09786	0.04997	0.05871	0.05902	0.04462	0.16796	0.08627	38
LONGING, PER., & BUS SE	39	0.00838	0.02671	0.01896	0.01494	0.00926	0.01089	0.02838	0.01953	39
MISC. & REPAIR SER	40	0.01205	0.01295	0.01233	0.01001	0.00879	0.01282	0.02281	0.01557	40
MEDICAL SERVICES	41	0.00492	0.00568	0.00537	0.00500	0.01022	0.00493	0.01687	0.01095	41
ENTER, EDUC., & NONPROF	42	0.00669	0.00793	0.00853	0.00668	0.01148	0.00692	0.02124	0.01407	42
FUELLINE TRANSPORT	43	0.00063	0.00167	0.00077	0.00075	0.00040	0.00125	0.00082	0.00068	43
WATER FREIGHT TRANSP.	44	0.02279	0.01577	0.01027	0.00997	0.00453	0.01210	0.02690	0.01055	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OVR	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OVR	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OVR	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OVR & STR LK NR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
NONFABRIC & TIC	52	0.14341	0.18334	0.17549	0.16287	0.33422	0.15917	0.55105	0.35800	52

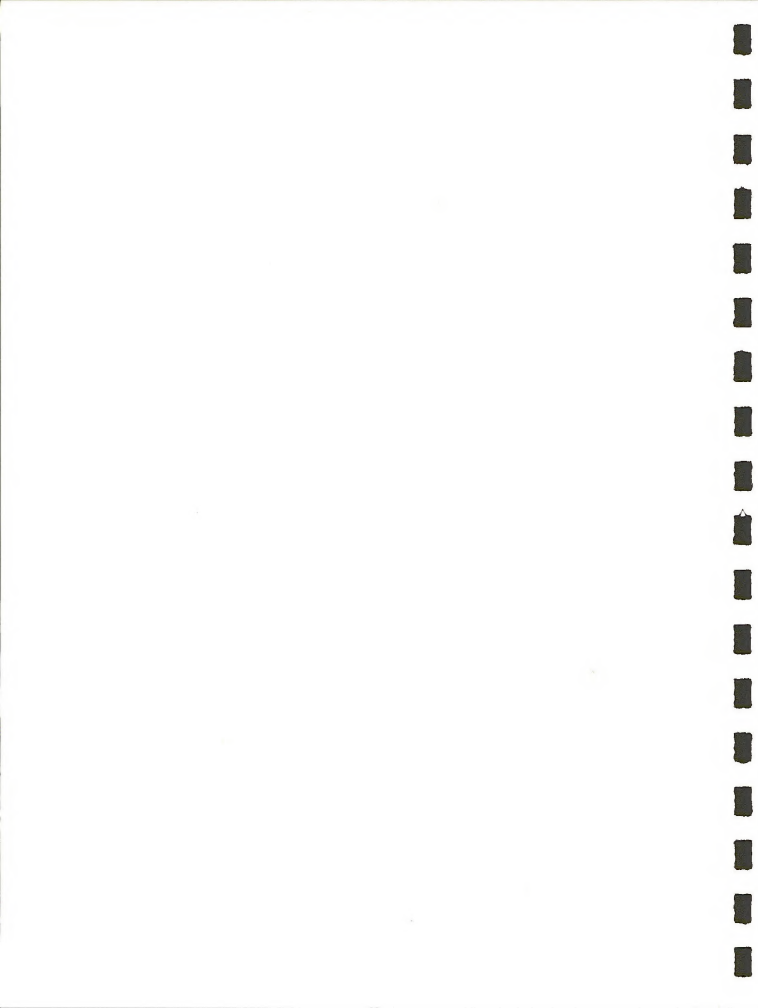




NORTHWEST NEW MEXICO ILM IMPACT AREA  
DIRECT, INDIRECT, AND INDUCED COEFFICIENTS  
INDUSTRY PURCHASING

PAGE 2

		9	10	11	12	13	14	15	16	
LIVESTOCK & LIV. PROD.	1	0.00332	0.00374	0.00411	0.00444	0.01012	0.00974	0.00926	0.01041	1
GRAINS & SEED CROPS	2	0.00059	0.00067	0.00109	0.00116	0.00149	0.00138	0.00132	0.00158	2
FRUITS & NUT TREES	3	0.00031	0.00035	0.00099	0.00103	0.00122	0.00117	0.00112	0.00120	3
VEGETABLES	4	0.00014	0.00016	0.00044	0.00045	0.00054	0.00052	0.00050	0.00057	4
AGR., FOR., & FISH SEV	5	0.00021	0.00025	0.00038	0.00040	0.00191	0.00127	0.00115	0.00541	5
OTHER AGRICULTURE PRO.	6	0.00005	0.00006	0.00006	0.00007	0.00162	0.00173	0.00107	0.00014	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
COAL PITUMINOUS	8	0.00034	0.00021	0.00417	0.00098	0.00045	0.00042	0.00040	0.00057	8
COAL BETHELMUM	9	1.00068	0.00476	0.01526	0.01566	0.01102	0.01221	0.01425	0.03107	9
NAT. GAS & NAT. GAS LIQ	10	0.00123	0.07642	0.00313	0.00260	0.00257	0.00254	0.00257	0.00391	10
CONST. SAND & GRAVEL	11	0.00019	0.00021	1.00624	0.00075	0.00183	0.00114	0.00314	0.02492	11
OTHER MINING	12	0.00000	0.00000	0.00005	1.00005	0.00006	0.00009	0.00005	0.00010	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & RETAIL CONSTR.	18	0.03549	0.04027	0.01241	0.01851	0.00948	0.00914	0.00879	0.01143	18
FOOD & KINDRED PROD.	19	0.00321	0.00360	0.01198	0.01233	0.01470	0.01409	0.01354	0.01534	19
L PAPER & WOOD PROD.	20	0.00069	0.00078	0.00113	0.00138	0.00638	0.00050	0.03503	0.00531	20
L PRINTING	21	0.00016	0.00018	0.00036	0.00042	0.00050	0.00050	0.00048	0.00060	21
I PETROLEUM PROD.	22	0.00911	0.00946	0.03233	0.03336	0.02324	0.02585	0.03030	0.06663	22
N CONCRETE, GLASS, & STO	23	0.00029	0.00033	0.03022	0.03073	0.03461	0.05112	0.03181	0.06050	23
F FABRICATED METAL PROD.	24	0.00054	0.00062	0.00034	0.00046	0.01532	0.02428	0.01634	0.02588	24
MACHINERY PROD.	25	0.00048	0.00112	0.00336	0.01019	0.00124	0.00098	0.00073	0.00105	25
I ELECTRICAL PROD.	26	0.00007	0.00009	0.00027	0.00027	0.00043	0.00047	0.00044	0.00051	26
N MISC MANUFACTURING	27	0.00133	0.00144	0.00459	0.00477	0.00663	0.00656	0.00581	0.00630	27
D RAILROAD TRANSPORT	28	0.00151	0.00166	0.00394	0.00207	0.01396	0.01062	0.01066	0.01471	28
U LOCAL GROUND TRANSPORT	29	0.00069	0.00077	0.00253	0.00259	0.00312	0.00298	0.00287	0.00375	29
S OTHER TRANSPORTATION	30	0.00064	0.00072	0.00230	0.00903	0.00296	0.00293	0.00279	0.00310	30
T COMMUNICATIONS	31	0.00309	0.00355	0.00785	0.00808	0.01307	0.01405	0.01288	0.01557	31
F ELECTRICAL UTILITIES	32	0.00725	0.00423	0.02223	0.02100	0.00837	0.00785	0.00793	0.00904	32
Y GAS UTILITIES	33	0.00526	0.01527	0.01347	0.00994	0.01164	0.01110	0.01056	0.01289	33
WATER & SEWER UTL.	34	0.00105	0.00115	0.00823	0.00199	0.00270	0.00266	0.00246	0.00307	34
WHOLESALE TRADE	35	0.00949	0.01384	0.03168	0.03480	0.06411	0.06709	0.05302	0.06385	35
RETAIL TRADE	36	0.02838	0.03194	0.08726	0.08446	0.18656	0.14614	0.12695	0.14697	36
FINANCE & INSURANCE	37	0.00786	0.00900	0.01638	0.02162	0.01733	0.01782	0.01663	0.01967	37
REAL ESTATE & HOMES	38	0.15380	0.17424	0.09359	0.10709	0.10710	0.10516	0.09947	0.11749	38
HOUSING, PER. & BUS SE	39	0.01085	0.01233	0.01998	0.02735	0.02440	0.02309	0.02529	0.03157	39
MISC. RETAIL SER	40	0.00853	0.00968	0.02055	0.02098	0.03883	0.04686	0.03786	0.03967	40
MEDICAL SERVICES	41	0.00361	0.00405	0.01349	0.01348	0.01649	0.01581	0.01521	0.01721	41
ENTER. EDUC. & NONPROF	42	0.00518	0.00560	0.01599	0.01511	0.02123	0.02126	0.02017	0.02302	42
PIPELINE TRANSPORT	43	0.00051	0.00055	0.00104	0.00101	0.00091	0.00098	0.00116	0.00250	43
MOTOR FREIGHT TRANSP.	44	0.00355	0.00406	0.01359	0.02200	0.03036	0.03463	0.03443	0.04062	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OIER	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OIER	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OIER	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OIER & STR LK RR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOMERENT & IFC	52	0.11684	0.13085	0.44105	0.45380	0.53935	0.51701	0.49732	0.56249	52



NORTHWEST NEW MEXICO HIM IMPACT AREA  
DIRECT, INDIRECT, AND INDUCED COEFFICIENTS  
INDUSTRY PURCHASING

PAGE 3

		17	18	19	20	21	22	23	24	
LIVESTOCK & LIV. PROD.	1	0.00956	0.01289	0.58347	0.00688	0.00937	0.00467	0.00960	0.00799	1
GRAINS & SEED CROPS	2	0.00139	0.00173	0.06035	0.00093	0.00127	0.00073	0.00139	0.00108	2
FRUITS & NUT TREES	3	0.00117	0.00159	0.00376	0.00084	0.00115	0.00051	0.00117	0.00098	3
VEGETABLES	4	0.00052	0.00070	0.00114	0.00037	0.00051	0.00023	0.00052	0.00043	4
AGR., FOR., & FISH SEV	5	0.00355	0.00120	0.00261	0.00033	0.00044	0.00026	0.00046	0.00038	5
OTHER AGRICULTURE PRO.	6	0.00049	0.00027	0.00013	0.00005	0.00007	0.00005	0.00008	0.00006	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
COAL BITUMINOUS	8	0.00044	0.00049	0.00045	0.00078	0.00044	0.00095	0.00097	0.00061	8
CRUDE PETROLEUM	9	0.02119	0.01474	0.00722	0.01035	0.00829	0.49352	0.01365	0.00491	9
NAT. GAS & NAT. GAS LIQ	10	0.00309	0.00314	0.00164	0.00278	0.00231	0.03144	0.00418	0.00256	10
CONST. SAND & GRAVEL	11	0.00562	0.00513	0.00010	0.00007	0.00007	0.00018	0.02277	0.00007	11
OTHER MINING	12	0.00005	0.00001	0.00000	0.00000	0.00000	0.00000	0.00183	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	1.00000	0.00000	0.00900	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAINT. & REPAIR CONSTR.	18	0.00960	1.01038	0.00930	0.01110	0.01172	0.03406	0.01360	0.00927	18
E FOOD & KINDRED PROD.	19	0.01408	0.01926	1.04479	0.01023	0.01381	0.00583	0.01405	0.01181	19
L PAER & WOOD PROD.	20	0.02905	0.01389	0.00065	1.11396	0.00109	0.00087	0.00394	0.00167	20
L PRINTING	21	0.00058	0.00059	0.00118	0.00030	1.00666	0.00026	0.00047	0.00249	21
I PETROLEUM PROD.	22	0.04530	0.03119	0.01524	0.02170	0.01735	1.06855	0.00845	0.01752	22
N CONCRETE, GLASS, & STO	23	0.02839	0.00739	0.00016	0.00039	0.00019	0.00033	1.06580	0.00079	23
G FABRICATED METAL PROD.	24	0.02773	0.01422	0.00543	0.00033	0.00273	0.00121	0.00043	1.01410	24
MACHINERY PROD.	25	0.00089	0.00066	0.00022	0.00043	0.00030	0.00063	0.00430	0.00214	25
I ELECTRICAL PROD.	26	0.00047	0.00047	0.00039	0.00022	0.00029	0.00013	0.00035	0.00025	26
N MISC MANUFACTURING	27	0.00601	0.00762	0.00358	0.00426	0.00542	0.00244	0.00766	0.00464	27
D RAILROAD TRANSPORT	28	0.01106	0.00729	0.00526	0.01565	0.00609	0.00249	0.02668	0.00839	28
U LOCAL GROUND TRANSPORT	29	0.00298	0.00406	0.00159	0.00219	0.00306	0.00123	0.00303	0.00250	29
S OTHER TRANSPORTATION	30	0.00780	0.00376	0.00149	0.00198	0.00268	0.00114	0.00281	0.00278	30
T COMMUNICATIONS	31	0.01325	0.01377	0.00865	0.00874	0.02066	0.00526	0.01486	0.01147	31
K ELECTRICAL UTILITIES	32	0.00788	0.00951	0.00587	0.01085	0.00896	0.00968	0.01154	0.00813	32
Y GAS UTILITIES	33	0.01130	0.01383	0.00741	0.01337	0.01094	0.02387	0.02093	0.01265	33
WATER & SEWER UTIL.	34	0.00260	0.00317	0.00197	0.00201	0.00260	0.00264	0.00247	0.00195	34
WHOLESALE TRADE	35	0.05637	0.05618	0.03275	0.03676	0.03514	0.01715	0.00421	0.03451	35
RETAIL TRADE	36	0.14155	0.18455	0.05977	0.07237	0.09881	0.04408	0.09949	0.08795	36
FINANCE & INSURANCE	37	0.01716	0.01973	0.01026	0.01275	0.01738	0.01321	0.01681	0.01374	37
REAL ESTATE & HOMES	38	0.10464	0.13096	0.06435	0.07477	0.10944	0.12651	0.11754	0.09048	38
LONGING, PER., & BUS SE	39	0.03538	0.03090	0.01421	0.01614	0.03352	0.01886	0.02615	0.01941	39
MISC & REPAIR SER	40	0.03406	0.02583	0.01931	0.01933	0.02261	0.01078	0.02425	0.01531	40
HOSPITAL SERVICES	41	0.01580	0.02168	0.00965	0.01150	0.01556	0.00653	0.01580	0.01329	41
ENTR., EDUC., & NONPROF	42	0.02075	0.02600	0.01138	0.01086	0.02241	0.00961	0.02028	0.01665	42
LIFELINE TRANSPORT	43	0.00178	0.00123	0.00060	0.00096	0.00071	0.02383	0.00109	0.00068	43
WATER FREIGHT TRANSP.	44	0.03933	0.03226	0.01163	0.01534	0.01793	0.01180	0.00962	0.00203	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OIER	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MIN. CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OIER	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OIER	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OIER & STR LK RR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOUSEHOLD & PFC	52	0.51687	0.70917	0.27603	0.37606	0.50869	0.21274	0.51672	0.43465	52



NORTHWEST NEW MEXICO RIM IMPACT AREA  
DIRECT, INDIRECT, AND INDUCED COEFFICIENTS  
INDUSTRY PURCHASING

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		25	26	27	28	29	30	31	32	
LIVESTOCK & LIV. PROD.	1	0.01121	0.00849	0.00859	0.01033	0.00968	0.00918	0.00889	0.00444	1
GRAINS & SEED CROPS	2	0.00154	0.00115	0.00115	0.00140	0.00129	0.00120	0.00128	0.00060	2
FRUITS & NUT TREES	3	0.00136	0.00104	0.00099	0.00127	0.00119	0.00111	0.00108	0.00054	3
VEGETABLES	4	0.00060	0.00046	0.00044	0.00056	0.00053	0.00049	0.00048	0.00024	4
AGR., FOR., & FISH SEV	5	0.00055	0.00041	0.00040	0.00050	0.00045	0.00039	0.00042	0.00022	5
OTHER AGRICULTURE PRO.	6	0.00009	0.00007	0.00006	0.00023	0.00007	0.00013	0.00008	0.00004	6
URANUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
COAL BITUMINOUS	8	0.00088	0.00082	0.00058	0.00049	0.00045	0.00030	0.00048	0.04580	8
CRUDE PETROLEUM	9	0.01443	0.00751	0.00842	0.01646	0.01767	0.00930	0.00785	0.01202	9
NAT. GAS & NAT. GAS LIQ	10	0.00370	0.00295	0.00218	0.00292	0.00285	0.00206	0.00237	0.01400	10
CONCR. SAND & GRAVEL	11	0.00012	0.00008	0.00021	0.00029	0.00006	0.00004	0.00013	0.00019	11
OTHER MINING	12	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & REPAIR CONSTR.	18	0.01630	0.01123	0.00876	0.05466	0.00944	0.00652	0.02357	0.03522	18
E FOOD & KINDRED PROD.	19	0.01638	0.01254	0.01288	0.01512	0.01444	0.01385	0.01293	0.00658	19
L FUR & WOOD PROD.	20	0.02459	0.00316	0.00516	0.00171	0.00111	0.00099	0.00117	0.00113	20
L PRINTING	21	0.00076	0.00037	0.00053	0.00065	0.00051	0.00032	0.00071	0.00020	21
I PETROLEUM PROD.	22	0.03032	0.01544	0.01769	0.03502	0.03638	0.01964	0.01638	0.02164	22
N CONCRETE, GLASS, & STO	23	0.00028	0.00079	0.00771	0.00049	0.00017	0.00012	0.00025	0.00040	23
G FABRICATED METAL PROD.	24	0.00460	0.00031	0.00041	0.00095	0.00032	0.00024	0.00048	0.00058	24
MACHINERY PROD.	25	1.04496	0.00058	0.00054	0.00029	0.00057	0.00018	0.00025	0.00086	25
I ELECTRICAL PROD.	26	0.00092	1.08894	0.00025	0.00031	0.00047	0.00034	0.00030	0.00016	26
N MISC MANUFACTURING	27	0.00722	0.00671	1.13511	0.00585	0.00576	0.00500	0.00518	0.00251	27
D RAILROAD TRANSPORT	28	0.01267	0.00778	0.00501	1.02924	0.00154	0.00078	0.00118	0.01716	28
U LOCAL GROUND TRANSPORT	29	0.00347	0.00265	0.00250	0.00635	1.00558	0.00282	0.00143	0.00129	29
S OTHER TRANSPORTATION	30	0.00334	0.00241	0.00243	0.00046	0.00298	1.00399	0.00250	0.00129	30
T COMMUNICATIONS	31	0.01908	0.01150	0.01248	0.01327	0.01173	0.00836	1.01898	0.00668	31
K ELECTRICAL UTILITIES	32	0.01382	0.01267	0.00871	0.00953	0.00916	0.00601	1.01898	0.00668	32
Y GAS UTILITIES	33	0.01737	0.01537	0.01017	0.01183	0.01129	0.00918	0.01153	0.00594	33
WATER & SEWER UTIL.	34	0.00617	0.00282	0.00215	0.00353	0.00477	0.00260	0.00327	0.00183	34
WHOLESALE TRADE	35	0.00033	0.00204	0.00775	0.02856	0.03888	0.02057	0.02240	0.01653	35
RETAIL TRADE	36	0.13659	0.08704	0.08704	0.10458	0.10617	0.08967	0.09308	0.04822	36
FINANCE & INSURANCE	37	0.02184	0.01571	0.01487	0.01574	0.01786	0.01244	0.01456	0.00970	37
REAL ESTATE & HOMES	38	0.14060	0.09748	0.09205	0.12570	0.10248	0.08713	0.10059	0.04945	38
EDUCATION, RECR. & BUS SE	39	0.06285	0.01969	0.02071	0.01872	0.01787	0.01398	0.02116	0.01014	39
MISC & REPAIR SER	40	0.02520	0.01639	0.01571	0.01755	0.03652	0.01310	0.01938	0.01043	40
MEDICAL SERVICES	41	0.01839	0.01410	0.01335	0.01703	0.01625	0.01511	0.01459	0.00739	41
ENTER., EDUC., & MONITOR	42	0.02446	0.01769	0.01786	0.02145	0.02075	0.01746	0.02099	0.00938	42
PIPELINE TRANSPORT	43	0.00105	0.00061	0.00065	0.00134	0.00148	0.00084	0.00068	0.00067	43
MOTOR FREIGHT TRANSP.	44	0.02740	0.01910	0.01629	0.01375	0.01502	0.00666	0.00808	0.01190	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
POWER PLANT OIER	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
SURFACE COAL OIER	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
UNDERGROUND COAL OIER	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OIER & STK LR KR	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOUSEHOLD & FIC	52	0.60110	0.46113	0.43650	0.55691	0.53164	0.49422	0.47715	0.24176	52



NORTHWEST NEW MEXICO RIM IMPACT AREA  
DIRECT, INDIRECT, AND INDUCED COEFFICIENTS  
INDUSTRY PURCHASING

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		41	42	43	44	45	46	47	48	
LIVESTOCK & LIV. PROD.	1	0.01585	0.01567	0.01101	0.01238	0.00426	0.00475	0.00812	0.00224	1
GRAINS & SEED CROPS	2	0.00209	0.00401	0.00152	0.00294	0.00057	0.00064	0.00114	0.00030	2
FRUITS & NUT TREES	3	0.00221	0.00158	0.00133	0.00149	0.00053	0.00058	0.00099	0.00028	3
VEGETABLES	4	0.00098	0.00069	0.00059	0.00066	0.00023	0.00026	0.00044	0.00012	4
AGE., FOL., & FISH SEV	5	0.00070	0.00097	0.00055	0.00060	0.00030	0.00023	0.00207	0.00010	5
OTHER AGRICULTURE PRO.	6	0.00013	0.00026	0.00010	0.00010	0.00019	0.00004	0.00078	0.00002	6
URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
COAL BITUMINOUS	8	0.00107	0.00173	0.00219	0.00068	0.00016	0.00051	0.00037	0.00051	8
CRUDE PETROLEUM	9	0.01286	0.01491	0.02339	0.03321	0.00424	0.01084	0.01459	0.00285	9
NAT. GAS & NAT. GAS LIQ	10	0.00426	0.00582	0.03169	0.00425	0.00099	0.01264	0.00238	0.00068	10
CONST. SAND & GRAVEL	11	0.00012	0.00025	0.00035	0.00009	0.00137	0.00019	0.00799	0.00005	11
OTHER MINING	12	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00006	0.00000	12
RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15
HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
S MAIN. & REPAIR CONSTR.	18	0.02172	0.04575	0.06768	0.01453	0.00324	0.03285	0.00763	0.00362	18
E FOOD & KINDRED PROD.	19	0.02347	0.01838	0.01596	0.01806	0.00636	0.00705	0.01192	0.00332	19
L TALKER & WOOD PROD.	20	0.00154	0.00185	0.00195	0.00146	0.00244	0.00170	0.01278	0.00131	20
L FURNITURE	21	0.00062	0.00572	0.00064	0.00079	0.00018	0.00020	0.00038	0.00008	21
I PETROLEUM PROD.	22	0.02670	0.03066	0.04067	0.07120	0.00495	0.02067	0.03112	0.00601	22
N CONCRETE, GLASS, & STG	23	0.00031	0.00050	0.00060	0.00024	0.00417	0.00073	0.03689	0.00066	23
G FABRICATED METAL PROD.	24	0.00056	0.00088	0.00114	0.00047	0.00081	0.00055	0.01082	0.00009	24
MACHINERY PROD.	25	0.00046	0.00057	0.00095	0.00090	0.00016	0.00058	0.00058	0.00001	25
I ELECTRICAL PROD.	26	0.00048	0.00055	0.00034	0.00122	0.00013	0.00015	0.00036	0.00007	26
N MISC MANUFACTURING	27	0.01016	0.01146	0.00607	0.00692	0.00242	0.00268	0.00507	0.00126	27
D RAILROAD TRANSPORT	28	0.00258	0.00318	0.00363	0.00950	0.00184	0.01660	0.00918	0.00249	28
U LOCAL GROUND TRANSPORT	29	0.00385	0.00387	0.00337	0.00381	0.00134	0.00153	0.00252	0.00071	29
S OTHER TRANSPORTATION	30	0.00354	0.00366	0.00307	0.00414	0.00245	0.00139	0.01867	0.00065	30
T COMMUNICATIONS	31	0.02223	0.02493	0.01899	0.02328	0.00936	0.00689	0.01096	0.00241	31
R ELECTRICAL UTILITIES	32	0.02080	0.03594	0.03987	0.00940	0.00307	0.01071	0.00649	0.01138	32
G GAS UTILITIES	33	0.02108	0.02993	0.03987	0.01416	0.00448	0.05390	0.00934	0.00293	33
Y WATER & SEWER UTIL.	34	0.01037	0.01113	0.00284	0.00320	0.00100	0.00191	0.00220	0.00069	34
WHOLESALE TRADE	35	0.04045	0.04100	0.03512	0.06263	0.01220	0.01575	0.04536	0.00720	35
RETAIL TRADE	36	0.14702	0.13898	0.11356	0.14758	0.04800	0.05199	0.11268	0.02391	36
FINANCE & INSURANCE	37	0.02257	0.02005	0.02717	0.02217	0.00635	0.01042	0.01450	0.00916	37
REAL ESTATE & HOMES	38	0.19116	0.19540	0.14750	0.13596	0.04186	0.05258	0.08701	0.02506	38
DRUGS, IER., & RUB SE	39	0.02730	0.04214	0.03017	0.02442	0.00841	0.00924	0.01621	0.00361	39
MISC & REPAIR SHG	40	0.03679	0.04579	0.02700	0.07394	0.00905	0.01436	0.01744	0.00729	40
MEDICAL SERVICES	41	0.03250	0.02071	0.01799	0.02030	0.00732	0.00795	0.01362	0.00376	41
ENTER., EDU., & RECREATION	42	0.02551	1.09945	0.02363	0.02421	0.00817	0.00931	0.01567	0.00430	42
PIPELINE TRANSPORT	43	0.00109	0.00124	1.00312	0.00287	0.00036	0.00067	0.00100	0.00021	43
WATER TRANSPORT	44	0.01513	0.01626	0.02254	1.19366	0.00706	0.01197	0.00307	0.00307	44
POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	45
POWER PLANT OPER.	46	0.00000	0.00000	0.00000	0.00000	1.00000	1.00000	0.00000	0.00000	46
COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	47
SURFACE COAL OPER.	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.73534	0.00000	1.00000	48
UNDERGROUND COAL OPER.	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
RAILROAD CONSTR.	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
COAL OPER. & STEEL	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
HOUSEHOLD & SVC	52	0.67203	0.67658	0.58806	0.66377	0.23459	0.25957	0.43737	0.12248	52





NORTHWEST NEW MEXICO BLM IMPACT AREA  
DIRECT, INDIRECT, AND INDUCED COEFFICIENTS  
INDUSTRY PURCHASING

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		49	50	51	52	*** ROW SUMS ***
	LIVESTOCK & LIV. PROD.	1	0.00742	0.00975	0.00264	0.02216 1 2.84741
	GRAINS & SEED CROPS	2	0.00098	0.00139	0.00035	0.00290 2 1.32791
	FRUITS & NUT TREES	3	0.00092	0.00122	0.00032	0.00276 3 1.05831
	VEGETABLES	4	0.00041	0.00053	0.00014	0.00122 4 1.03202
	AGK. & FOD. & FISH SEV	5	0.00033	0.00536	0.00012	0.00096 5 1.22613
	OTHER AGRICULTURE PRO.	6	0.00006	0.00014	0.00002	0.00016 6 1.18410
	URANIUM MINING	7	0.00000	0.00000	0.00000	0.00000 7 1.41837
	COAL PITUMINOUS	8	0.00092	0.00042	0.00054	0.00071 8 1.08306
	CRUDE PETROLEUM	9	0.00716	0.01141	0.00321	0.01612 9 2.13191
	NAT. GAS & NAT. GAS LIQ	10	0.00189	0.00248	0.00078	0.00463 10 1.53575
	CONST. SAND & GRAVEL	11	0.00016	0.00255	0.00006	0.00009 11 1.09214
	OTHER MINING	12	0.00001	0.00001	0.00000	0.00000 12 1.00257
	RESIDENTIAL CONSTR.	13	0.00000	0.00000	0.00000	0.00000 13 1.00000
	NONRESIDENTIAL CONSTR.	14	0.00000	0.00000	0.00000	0.00000 14 1.00000
	PUBLIC UTILITY CONSTR.	15	0.00000	0.00000	0.00000	0.00000 15 1.00000
	HIGHWAY CONSTR.	16	0.00000	0.00000	0.00000	0.00000 16 1.00000
	OTHER CONSTR. (NEW)	17	0.00000	0.00000	0.00000	0.00000 17 1.00000
S	MAIN. & REPAIR CONSTR.	18	0.00713	0.00908	0.00409	0.01495 18 1.97630
E	FOOD & KINDRED PROD.	19	0.01113	0.01451	0.00392	0.03340 19 1.64205
L	PAKER & WOOD PROD.	20	0.00912	0.00480	0.00185	0.00244 20 1.39954
L	PRINTING	21	0.00027	0.00055	0.00010	0.00077 21 1.04483
I	PETROLEUM PROD.	22	0.01502	0.02412	0.00677	0.03371 22 2.16393
N	CONCRETE, GLASS, & STG	23	0.00481	0.00700	0.00094	0.00029 23 1.41486
G	FABRICATED METAL PROD.	24	0.00024	0.00809	0.00011	0.00057 24 1.23518
	MACHINERY PROD.	25	0.00368	0.00064	0.00082	0.00043 25 1.18558
I	ELECTRICAL PROD.	26	0.00023	0.00035	0.00008	0.00066 26 1.10997
N	MISC MANUFACTURING	27	0.00418	0.00576	0.00148	0.01242 27 1.38739
D	RAILROAD TRANSPORT	28	0.00282	0.01324	0.00264	0.00170 28 1.39466
U	LOCAL GROUND TRANSPORT	29	0.00235	0.00308	0.00084	0.00703 29 1.13199
S	OTHER TRANSPORTATION	30	0.00215	0.00295	0.00077	0.00637 30 1.18448
T	COMMUNICATIONS	31	0.00694	0.01448	0.00278	0.01862 31 1.60698
K	ELECTRICAL UTILITIES	32	0.02032	0.00415	0.01260	0.01460 32 1.62409
Y	GAS UTILITIES	33	0.00858	0.01088	0.00336	0.02230 33 2.30764
	WATER & SEWER UTIL.	34	0.00183	0.00269	0.00079	0.00491 34 1.16311
	WHOLESALE TRADE	35	0.01830	0.01519	0.00806	0.04719 35 2.80145
	RETAIL TRADE	36	0.07703	0.14069	0.02796	0.22237 36 5.82186
	FINANCE & INSURANCE	37	0.01104	0.01617	0.00469	0.02967 37 1.85479
	REAL ESTATE & HOMES	38	0.07479	0.10306	0.02892	0.21099 38 6.31317
	LOGGING, PAPER, & RUBBER	39	0.01777	0.02920	0.00424	0.03363 39 2.10434
	MISC & REPAIR SER.	40	0.03569	0.04010	0.00932	0.03197 40 2.17500
	MEDICAL SERVICES	41	0.01257	0.01633	0.00443	0.03771 41 1.68373
	ENTER. ENDS. & REPAIRS	42	0.01826	0.01918	0.00506	0.04229 42 1.99525
	PIPELINE TRANSPORT	43	0.00058	0.00153	0.00074	0.00142 43 1.07407
	WATER FREIGHT TRANSP.	44	0.00674	0.00488	0.00337	0.01417 44 2.21113
	POWER PLANT CONSTR.	45	0.00000	0.00000	0.00000	0.00000 45 1.00000
	POWER PLANT OER	46	0.00000	0.00000	0.00000	0.00000 46 1.00000
	COAL MINE CONSTR.	47	0.00000	0.00000	0.00000	0.00000 47 1.00000
	SURFACE COAL OER	48	0.00000	0.00000	0.92616	0.00000 48 2.66150
	UNDERGROUND COAL OER	49	1.00000	0.00000	0.06921	0.00000 49 1.06921
	RAILROAD CONSTR.	50	0.00000	1.00000	0.00000	0.00000 50 1.00000
	COAL OER & STEEL RE	51	0.00000	0.00000	1.00000	0.00000 51 1.00000
	HOUSEHOLD & P/C	52	0.41079	0.53373	0.14444	1.23385 52 21.89777



## EMPLOYMENT MULTIPLIERS

In order to determine the employment multipliers for coal, power plant activity, and other related development, three basic steps (procedures) must be undertaken. First, wage information for the area or region under consideration must be determined in constant dollars - in this case 1977 dollars. Second, total output on an annual basis for an exemplary year using constant 1977 dollars must be determined. And finally, computations to determine the actual number of dollars from the technical process going for labor costs must also be derived.

Once having determined by sub-sector the number of dollars for labor costs flowing on an annual basis, the average labor unit cost is divided into each gross amount to determine the actual number of jobs supported in that specific sub-sector due to an exogenous increase in the specific activity being investigated, i.e., coal mine development, surface and underground coal operations, power plant construction, power plant operations, etc.

## WAGES

First, the level of wages must be determined. The average annual wages and labor cost figures for each of the 44 identified economic sub-sectors are listed on the following page.

Average employee costs for each of the 44 identified sectors in the input-output model were computed from available Employment Security Commission information. The 1976 average wage for the area was derived from Second Quarter 1976 "Covered Employment and Wages," Quarterly Report. An additional 7 percent was added to the 1976 average wages in order to arrive at the 1977 estimated average wages.

Personal interviews with Employment Security Commission staff members indicated that second quarter data would be reasonably representative of averages for the whole year. Averages for 1977 could not be obtained because all of the 1977 information has not yet been released.

Wages for each sector were computed at the four-county level unless the identified sector was non-existent or the wages were not available for that sector because of failure to disclose in one of the four counties. In a few cases single-county information was used when that information was obviously more representative of the wage in the area, i.e., coal mining wages were computed based upon San Juan County averages.

To these sector wages were added expected fringe benefits. The percentage of fringe benefits added to the wages was computed in several ways. First, several companies were contacted concerning additional costs for labor due to fringe benefits. These companies were principally in the construction and mining categories. For other areas where large companies were not predominant, averages were used which reflected minimum fringe benefits at various salary levels. Thus, the labor cost per employee is the estimated annual wage paid in 1977 plus the expected fringe benefit percentage.



# ESTIMATED ANNUAL WAGES AND LABOR COSTS PER EMPLOYEE

1977 Northwestern New Mexico

Sector	1977 Average Wage	Fringe Benefits (percent)	Annual Costs/ Employee
1. Livestock & Livestock Products	\$ 8,171	10	\$ 8,988
2. Grains & Seed Crops	5,821	10	6,403
3. Fruits & Nut Trees	5,821	10	6,403
4. Vegetables	5,821	10	6,403
5. Agriculture, Forestry & Fish Service	5,531	17	6,471
6. Other Agricultural Products	4,450	17	5,206
7. Uranium Mining	15,630	28	20,006
8. Coal, Bituminous	18,858	28	24,138
9. Crude Petroleum	14,219	28	18,200
10. Natural Gas & Natural Gas Liquids	14,219	28	18,200
11. Construction Sand & Gravel	15,667	20	18,800
12. Other Mining	15,667	28	20,054
13. Residential Construction	11,498	20	13,798
14. Nonresidential Construction	14,535	25	18,169
15. Public Utilities Construction	10,572	25	13,215
16. Highway Construction	16,238	25	20,297
17. Other Construction (New)	12,731	25	15,914
18. Maintenance & Repair Construction	10,571	15	12,157
19. Food & Kindred Products	18,814	16	10,224
20. Paper & Wood Products	8,244	16	9,563
21. Printing	7,322	16	8,494
22. Petroleum Products	11,634	16	13,495
23. Concrete, Glass & Stone	9,392	16	10,895
24. Fabricated Metal Products	11,509	16	13,351
25. Machinery Products	11,934	16	13,843
26. Electrical Products	8,225	16	9,541
27. Miscellaneous Manufacturing	6,755	16	7,836
28. Railroad Transportation	18,297	25	22,871
29. Local Ground Transportation	5,447	17	6,373
30. Other Transportation	12,246	16	14,205
31. Communications	12,153	16	14,098
32. Electrical Utilities	17,667	28	22,614
33. Gas Utilities	14,950	28	19,136
34. Water & Sewer Utilities	12,876	16	14,936
35. Wholesale Trade	11,300	16	13,108
36. Retail Trade	6,300	17	7,371
37. Finance & Insurance	8,816	16	10,227
38. Real Estate & Homes	7,345	16	8,520
39. Lodging & Personal & Business Services	5,605	17	6,558
40. Miscellaneous & Repair Services	8,572	16	9,944
41. Medical Services	11,119	14	12,683
42. Entertainment, Education & Nonprofit	6,797	16	7,885
43. Pipeline Transportation	17,424	23	21,416
44. Motor Freight Transportation	13,603	20	16,324

## Sources:

1977 Average Wage derived from "Covered Employment and Wages", Quarterly Report, Employment Security Commission of New Mexico, 2nd Quarter, 1976, published March 1977, and adjusted 7.0% to arrive at 1977 figure.

Fringe Benefits determined from interviews with private companies and unions. Minimum applicable percentages applied to most secondary and tertiary sectors.

Per employee costs representative of annual wage, not necessarily a 40-hour average work week.



### CALCULATING INDIRECT JOB IMPACT

Detailed calculations for the derivation of all indirect jobs created by coal and related development in the Northwest Region are too extensive to list here. However, listed below is a sample calculation which illustrates the procedure used to determine the estimated number of new indirect jobs created by development of coal and other related activities in the Northwest Region.

The first step in the procedure is to determine the annual flow of dollars going through the economy due to the increase in activity in a specific economic sub-sector. The example used in this case is power plant construction and the year is 1990. It is estimated that the new dollars brought to the area due to power plant construction in 1990 will be \$163 million. This direct impact in power plant construction is then multiplied by the coefficients listed in the input-output table, inverted version, i.e., the Direct, Indirect and Induced Effects for that specific column in which the activity is taking place, i.e., power plant construction.

In the following equations, the process is illustrated.

$$I_{ij} \times PPC_{1990} = \$IMP_{ij}$$
$$(.00436 \times \$162,793,000 = \$709,777)$$

Where:  $I_{ij}$  = coefficient from I/O Table of Direct, Indirect, and Induced Effects for row  $i$  and column entry  $j$ ;  $i=1, \dots, 44$  and  $j=1, \dots, 44$ . Example uses  $i=31$  and  $j=45$ , i.e.,  $I_{31,45}$

$PPC_{1990}$  = power plant construction impact for 1990, i.e., \$162,793,000.

$\$IMP_{ij}$  = dollar indirect impact in sub-sector  $i$  due to exogenous increase in sub-sector  $j$ ; i.e., impact on communications sub-sector due to an increase in power plant construction activity

From this calculation it is apparent that the model estimates that the increase in the communications sector during 1990 will be almost \$710 thousand.

The next calculation is to determine the amount of money in the communications sector that will be expended for labor, i.e., labor costs. The following equation illustrates this.





$$\text{\$IMP}_{ij} \times \text{LC}_{52j} = \text{\$LC}_{ij}$$

$$(\$709,777 \times .33547 = \$238,109)$$

Where:  $\text{LC}_{52j}$  = coefficient for labor costs in sub-sector j, Direct Coefficients Table; j=1, ... , 44 (i.e.,  $\text{LC}_{52,45} = .33547$ ).

$\text{\$LC}_{ij}$  = dollars flowing to labor cost in sub-sector j due to an increase in activity in sub-sector i (i.e., total labor cost in communications (j=45) as an indirect result of an increase in power plant construction activity (i=31) of \$162,793,000 in 1990).

After determining that just more than \$238,000 will flow into labor costs during 1990 through the communications sector due to increased power plant construction activity, the remaining step is to determine how many jobs this \$238,000 will support during 1990. This is accomplished by the following mathematical operation.

$$\text{\$LC}_{ij} \div \text{Annual ULC}_j = \text{Indirect Job}_{ij}$$

$$(\$238,109 \div 14,098 = 16.9)$$

Where:  $\text{Annual ULC}_j$  = annual average per unit labor cost in sub-sector j (i.e., in sub-sector j=45. Communications annual  $\text{ULC}_j = \$14,098$ ).

$\text{Indirect Job}_{ij}$  = Number of new jobs in sub-sector j supported by new activity in sub-sector i (i.e., i=31, power plant construction \$162,793,000 supports 16.9 jobs in j=45 communications).

This example shows that the resulting impact on jobs in this sub-sector - communications - will be 16.9 jobs for 1990. Obviously the number of jobs supported indirectly by activity in various power plant activity and related projects varies with the impact on an annual basis. However, as an example of the number and type of indirect jobs supported in selected years, 31 tables follow which list (in order) power plant construction, power plant operation, coal mine construction, surface coal operation, underground coal operation, railroad construction, railroad operation and total activity for the four development alternatives. These tables list the number of jobs directly created in each one of the major sub-sectors for the years 1980, 1985, and 1990.<sup>a</sup> It should be noted that the above described process is for the private sector only. The government sector is computed separately.

<sup>a</sup>The 44 sub-sector model results were aggregated into the standard 7 major sub-sectors plus government.



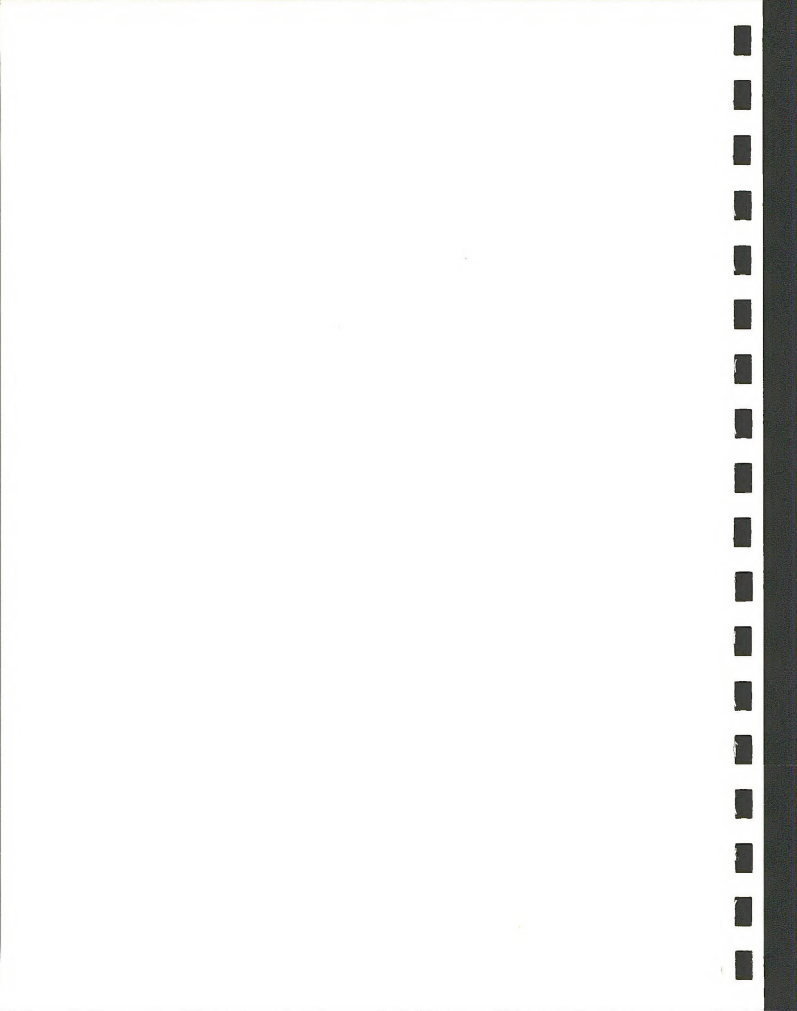
POWER PLANT CONSTRUCTION: NO ACTION ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	3.1	0	0
Mining	4.3	0	0
Construction	8.5	0	0
Manufacturing	40.3	0	0
Transportation, Communication & Utilities	31.0	0	0
Trade	201.8	0	0
Finance, Insurance & Real Estate	21.2	0	0
Services	87.3	0	0
Government	74.0	0	0
TOTAL	471.5	0	0



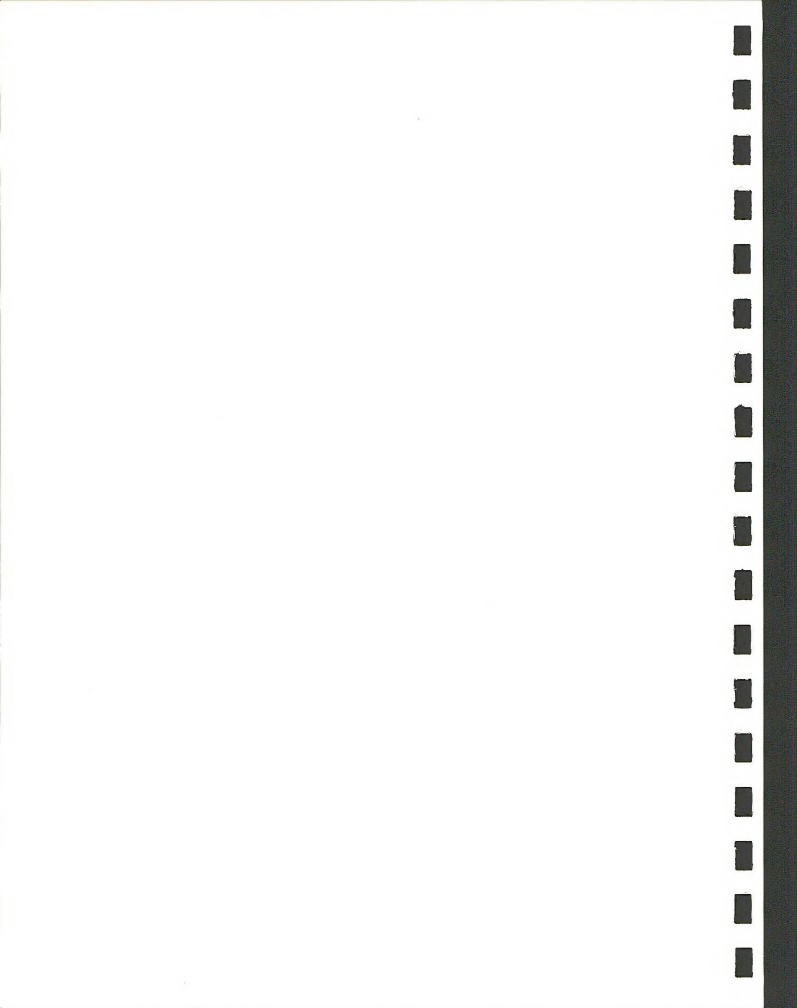
POWER PLANT OPERATION: NO ACTION ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.2	2.9	2.9
Mining	4.9	6.5	6.5
Construction	54.0	71.8	71.8
Manufacturing	18.5	24.6	24.6
Transportation, Communication & Utilities	75.7	100.7	100.7
Trade	161.9	215.3	215.3
Finance, Insurance & Real Estate	25.0	33.3	33.3
Services	76.1	101.2	101.2
Government	59.0	79.0	79.0
TOTAL	477.3	635.3	635.3



COAL MINE DEVELOPMENT: NO ACTION ALTERNATIVE

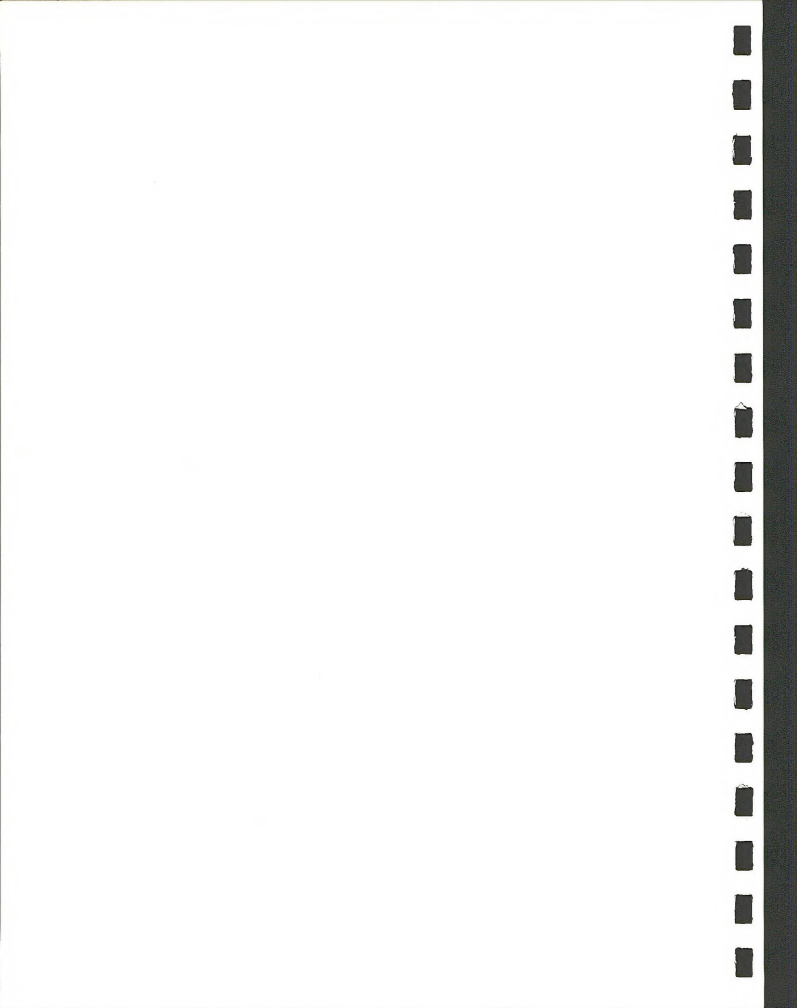
INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0.3	0	0
Mining	0.3	0	0
Construction	0.6	0	0
Manufacturing	4.3	0	0
Transportation, Communication & Utilities	2.9	0	0
Trade	14.4	0	0
Finance, Insurance & Real Estate	1.3	0	0
Services	4.7	0	0
Government	4.0	0	0
TOTAL	32.8	0	0





SURFACE COAL OPERATION: NO ACTION ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.9	3.0	2.7
Mining	2.3	2.0	2.2
Construction	19.4	20.0	18.0
Manufacturing	26.8	28.0	24.7
Transportation, Communication & Utilities	43.2	45.0	40.0
Trade	209.9	219.0	193.6
Finance, Insurance & Real Estate	27.7	28.9	25.5
Services	96.8	101.0	89.2
Government	80.0	83.0	73.0
TOTAL	509.0	529.9	468.9



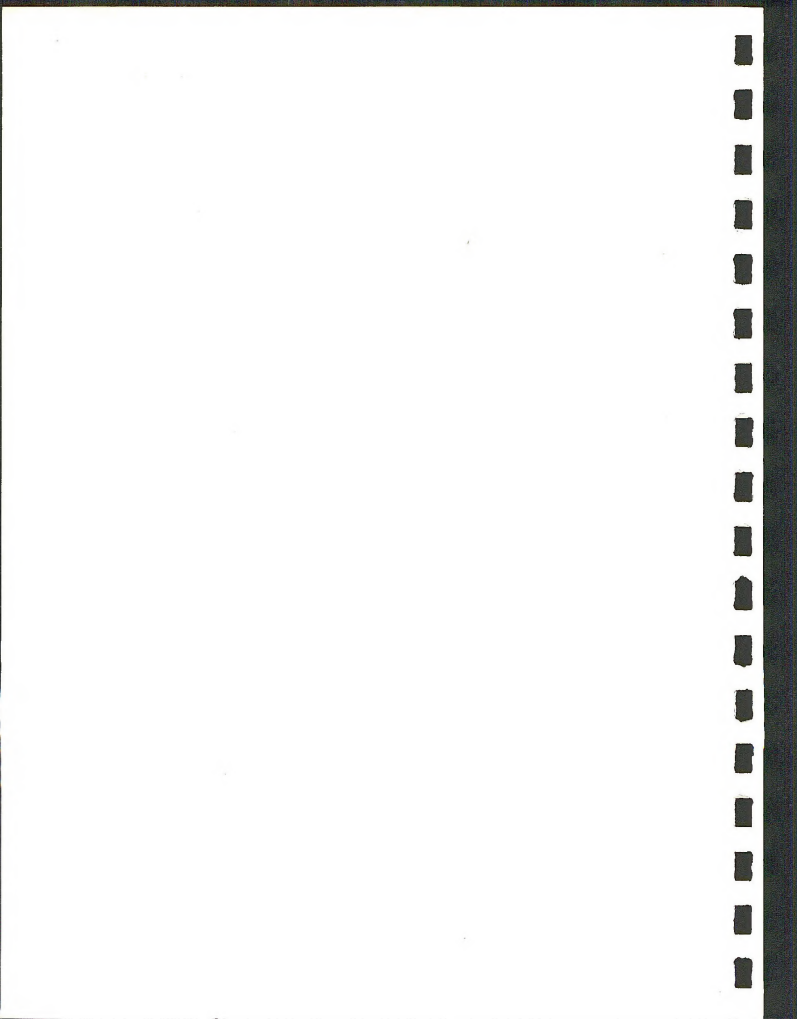
UNDERGROUND COAL OPERATION: NO ACTION ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0.5	1.4	1.4
Mining	0.3	0.8	0.8
Construction	2.1	5.7	5.7
Manufacturing	6.3	17.2	17.2
Transportation, Communication & Utilities	5.6	15.4	15.4
Trade	35.9	98.0	98.0
Finance, Insurance & Real Estate	4.1	11.3	11.3
Services	19.7	54.0	54.0
Government	15.0	40.0	40.0
TOTAL	89.5	243.8	243.8



TOTAL: NO ACTION ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	9.0	7.3	7.0
Mining	12.1	9.3	9.5
Construction	84.6	97.5	95.5
Manufacturing	96.2	69.8	66.5
Transportation, Communication & Utilities	158.4	161.1	156.1
Trade	623.9	532.3	506.9
Finance, Insurance & Real Estate	79.3	73.5	70.1
Services	284.6	256.2	244.4
Government	232.0	202.0	192.0
TOTAL	1580.1	1409.0	1348.0



POWER PLANT CONSTRUCTION:  
PARTIAL DEVELOPMENT ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	7.5	4.4	8.0
Mining	10.4	6.1	11.0
Construction	20.6	12.1	21.8
Manufacturing	97.7	57.3	103.5
Transportation, Communication & Utilities	75.2	44.2	79.7
Trade	488.6	286.8	517.8
Finance, Insurance & Real Estate	51.2	30.1	54.3
Services	211.5	124.2	224.2
Government	180.0	106.0	191.0
TOTAL	1142.7	671.2	1211.3





POWER PLANT OPERATION:  
PARTIAL DEVELOPMENT ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.2	4.6	7.6
Mining	4.9	10.2	16.8
Construction	54.0	112.8	186.4
Manufacturing	18.5	38.5	63.7
Transportation, Communication & Utilities	75.7	158.1	261.3
Trade	161.9	338.0	558.7
Finance, Insurance & Real Estate	25.0	52.2	86.3
Services	76.1	158.8	262.5
Government	59.0	123.0	204.0
TOTAL	477.3	996.2	1647.3



POWER LINE CONSTRUCTION:  
PARTIAL DEVELOPMENT ALTERNATIVE:

INDIRECT IMPACT  
Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0.2	0	0
Mining	0.2	0	0
Construction	0.8	0	0
Manufacturing	6.3	0	0
Transportation, Communication & Utilities	4.0	0	0
Trade	20.8	0	0
Finance, Insurance & Real Estate	1.9	0	0
Services	8.7	0	0
Government	6.0	0	0
TOTAL	48.9	0	0



COAL MINE DEVELOPMENT:  
PARTIAL DEVELOPMENT ALTERNATIVE

INDIRECT IMPACT  
Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.6	0	1.1
Mining	3.1	0	1.3
Construction	5.1	0	2.2
Manufacturing	38.8	0	16.4
Transportation, Communication & Utilities	26.1	0	11.0
Trade	129.8	0	54.8
Finance, Insurance & Real Estate	12.1	0	5.1
Services	42.6	0	18.0
Government	38.0	0	16.0
TOTAL	298.2	0	125.9



SURFACE COAL OPERATION:  
PARTIAL DEVELOPMENT ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.9	4.0	4.1
Mining	2.3	3.2	3.3
Construction	19.4	26.8	27.6
Manufacturing	26.8	37.0	38.1
Transportation, Communication & Utilities	43.2	59.5	61.4
Trade	209.9	289.5	298.5
Finance, Insurance & Real Estate	27.7	38.2	39.4
Services	96.8	133.5	137.6
Government	80.0	110.0	113.0
TOTAL	509.0	701.7	723.0





UNDERGROUND COAL OPERATION:  
PARTIAL DEVELOPMENT ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0.5	1.4	1.4
Mining	0.3	0.8	0.8
Construction	2.1	5.7	5.7
Manufacturing	6.3	17.2	17.2
Transportation, Communication & Utilities	5.6	15.4	15.4
Trade	35.9	97.9	97.9
Finance, Insurance & Real Estate	4.1	11.3	11.3
Services	20.0	54.0	54.0
Government	15.0	40.0	40.0
TOTAL	89.8	243.7	243.7



TOTAL: PARTIAL DEVELOPMENT ALTERNATIVE

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	15.9	14.4	22.2
Mining	21.2	20.3	33.2
Construction	102.0	157.4	243.7
Manufacturing	194.4	150.0	238.9
Transportation, Communication & Utilities	229.8	277.2	428.8
Trade	1046.9	1012.2	1527.7
Finance, Insurance & Real Estate	122.0	131.8	196.4
Services	455.7	470.5	696.3
Government	378.0	379.0	564.0
TOTAL	2565.9	2612.8	3951.2



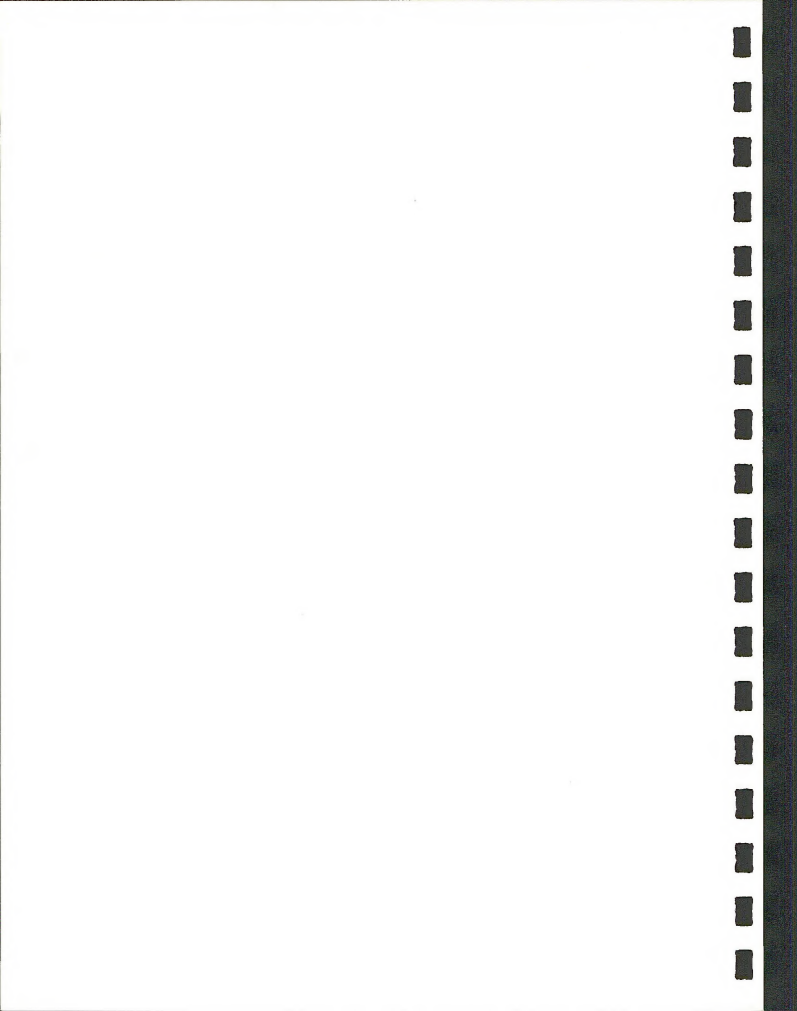
POWER PLANT CONSTRUCTION: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	7.5	4.4	8.0
Mining	10.4	6.1	11.0
Construction	20.6	12.1	21.8
Manufacturing	97.7	57.3	103.5
Transportation, Communication & Utilities	75.2	44.2	79.7
Trade	488.6	286.8	517.8
Finance, Insurance & Real Estate	51.2	30.1	54.3
Services	211.5	124.2	224.2
Government	180.0	106.0	191.0
TOTAL	1142.7	671.2	1211.3



POWER PLANT OPERATION: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.2	4.6	7.6
Mining	4.9	10.2	16.8
Construction	54.0	112.8	186.4
Manufacturing	18.5	38.5	63.7
Transportation, Communication & Utilities	75.7	158.1	261.3
Trade	161.9	338.0	558.7
Finance, Insurance & Real Estate	25.0	52.2	86.3
Services	76.1	158.8	262.5
Government	59.0	123.0	204.0
TOTAL	477.3	996.2	1647.3





POWER LINE CONSTRUCTION: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0.2	0	0
Mining	0.2	0	0
Construction	0.8	0	0
Manufacturing	6.3	0	0
Transportation, Communication & Utilities	4.0	0	0
Trade	20.8	0	0
Finance, Insurance & Real Estate	1.9	0	0
Services	8.7	0	0
Government	6.0	0	0
TOTAL	48.9	0	0



SURFACE COAL OPERATION: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.9	7.7	8.2
Mining	2.3	6.3	6.7
Construction	19.4	52.0	55.6
Manufacturing	26.8	71.8	76.6
Transportation, Communication & Utilities	43.2	115.6	123.5
Trade	209.9	562.3	600.3
Finance, Insurance & Real Estate	27.7	74.2	79.2
Services	96.8	259.2	276.8
Government	80.0	213.0	228.0
TOTAL	509.0	1362.1	1454.9



COAL MINE DEVELOPMENT: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	6.2	0	1.1
Mining	7.5	0	1.3
Construction	12.3	0	2.2
Manufacturing	93.2	0	16.4
Transportation, Communication & Utilities	62.9	0	11.0
Trade	312.2	0	54.8
Finance, Insurance & Real Estate	29.2	0	5.1
Services	102.4	0	18.0
Government	92.0	0	16.0
TOTAL	717.9	0	125.9



UNDERGROUND COAL OPERATION: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0.5	1.4	1.4
Mining	0.3	0.8	0.8
Construction	2.1	5.7	5.7
Manufacturing	6.3	17.2	17.2
Transportation, Communication & Utilities	5.6	15.4	15.4
Trade	36.0	98.0	98.0
Finance, Insurance & Real Estate	4.1	11.3	11.3
Services	20.0	54.9	54.9
Government	15.0	40.0	40.0
TOTAL	89.9	243.9	243.9





STAR LAKE RAILROAD CONSTRUCTION: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	5.7	0	0
Mining	1.7	0	0
Construction	7.0	0	0
Manufacturing	29.8	0	0
Transportation, Communication & Utilities	57.7	0	0
Trade	180.6	0	0
Finance, Insurance & Real Estate	17.4	0	0
Services	77.8	0	0
Government	54.3	0	0
TOTAL	432.0	0	0



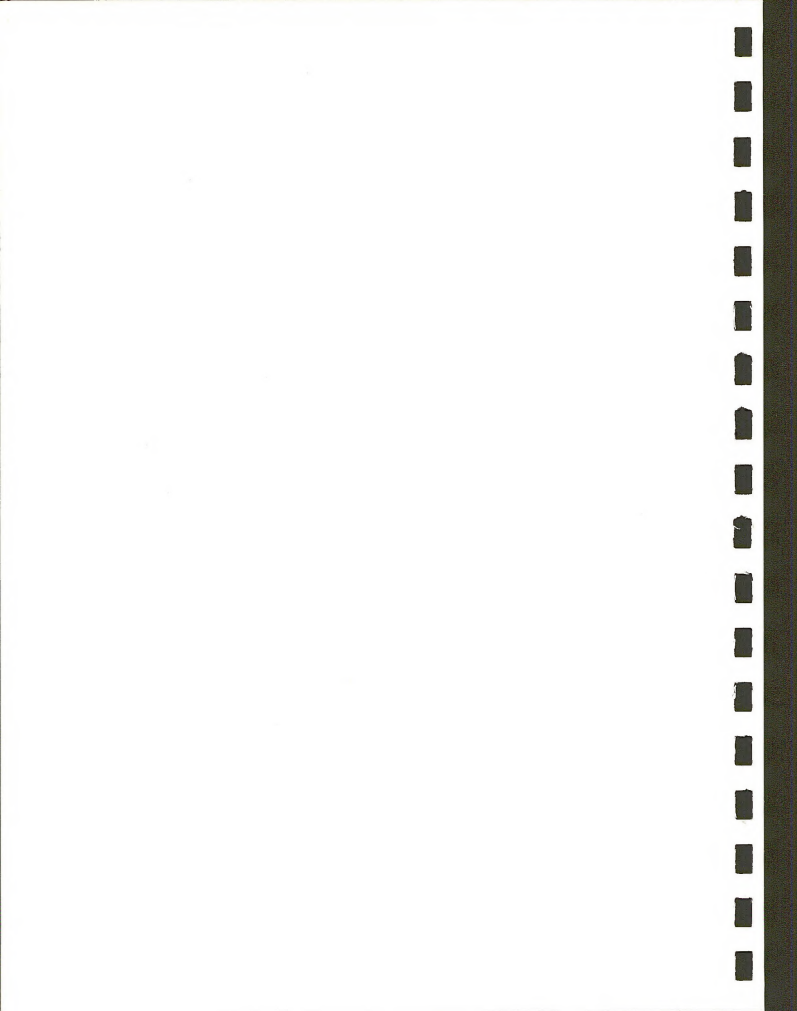
STAR LAKE RAILROAD OPERATIONS: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0	0.3	0.3
Mining	0	0.2	0.2
Construction	0	4.7	4.7
Manufacturing	0	1.6	1.6
Transportation, Communication & Utilities	0	3.9	3.9
Trade	0	15.7	15.7
Finance, Insurance & Real Estate	0	2.4	2.4
Services	0	7.5	7.5
Government	0	6.0	6.0
TOTAL	0	42.3	42.3



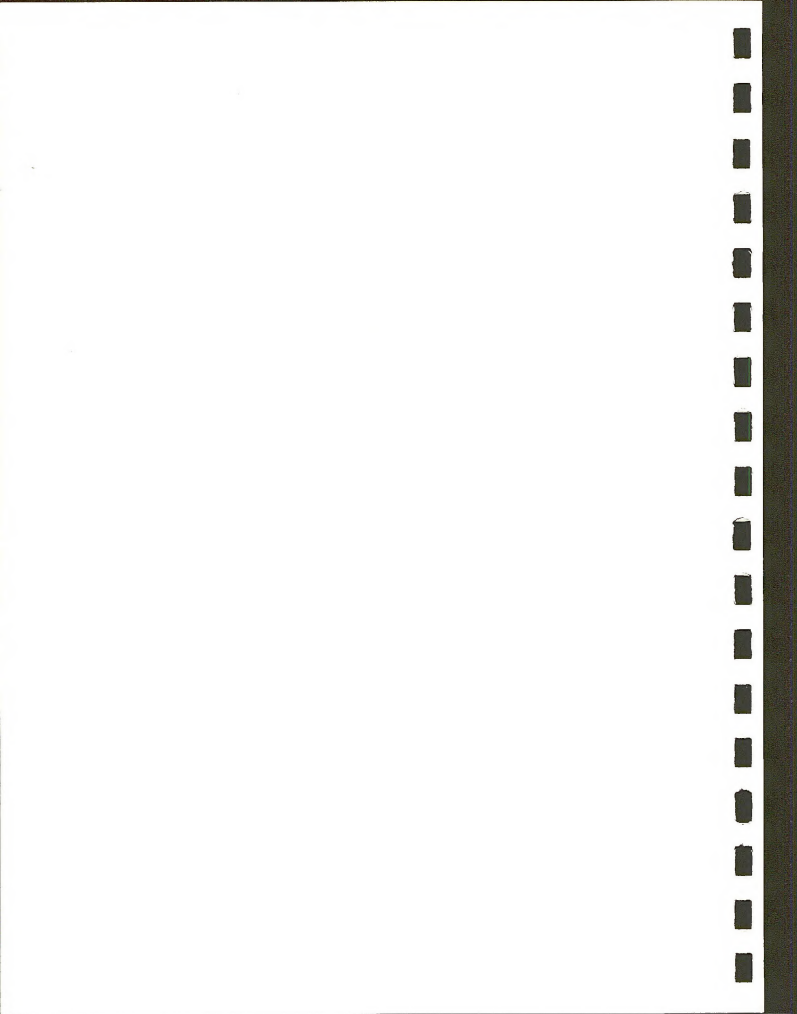
TOTAL: PROPOSED ACTION

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	25.2	18.4	26.6
Mining	27.3	23.6	36.8
Construction	116.2	187.3	276.4
Manufacturing	278.6	186.4	279.0
Transportation, Communication & Utilities	324.3	337.2	494.8
Trade	1410.0	1300.8	1845.3
Finance, Insurance & Real Estate	156.5	170.2	238.6
Services	593.3	604.6	843.9
Government	486.3	488.0	685.0
TOTAL	3417.7	3316.5	4726.4



POWER PLANT CONSTRUCTION:  
HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT  
Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	7.5	4.4	8.0
Mining	10.4	6.1	11.0
Construction	20.6	12.1	21.8
Manufacturing	97.7	57.3	103.5
Transportation, Communication & Utilities	75.2	44.2	79.7
Trade	488.6	286.8	517.8
Finance, Insurance & Real Estate	51.2	30.1	54.3
Services	211.5	124.2	224.2
Government	180.0	106.0	191.0
TOTAL	1142.7	671.2	1211.3





POWER PLANT OPERATION:  
HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.2	4.6	7.6
Mining	4.9	10.2	16.8
Construction	54.0	112.8	186.4
Manufacturing	18.5	38.5	63.7
Transportation, Communication & Utilities	75.7	158.1	261.3
Trade	161.9	338.0	558.7
Finance, Insurance & Real Estate	25.0	52.2	86.3
Services	76.1	158.8	262.5
Government	59.0	123.0	204.0
TOTAL	477.3	996.2	1647.3

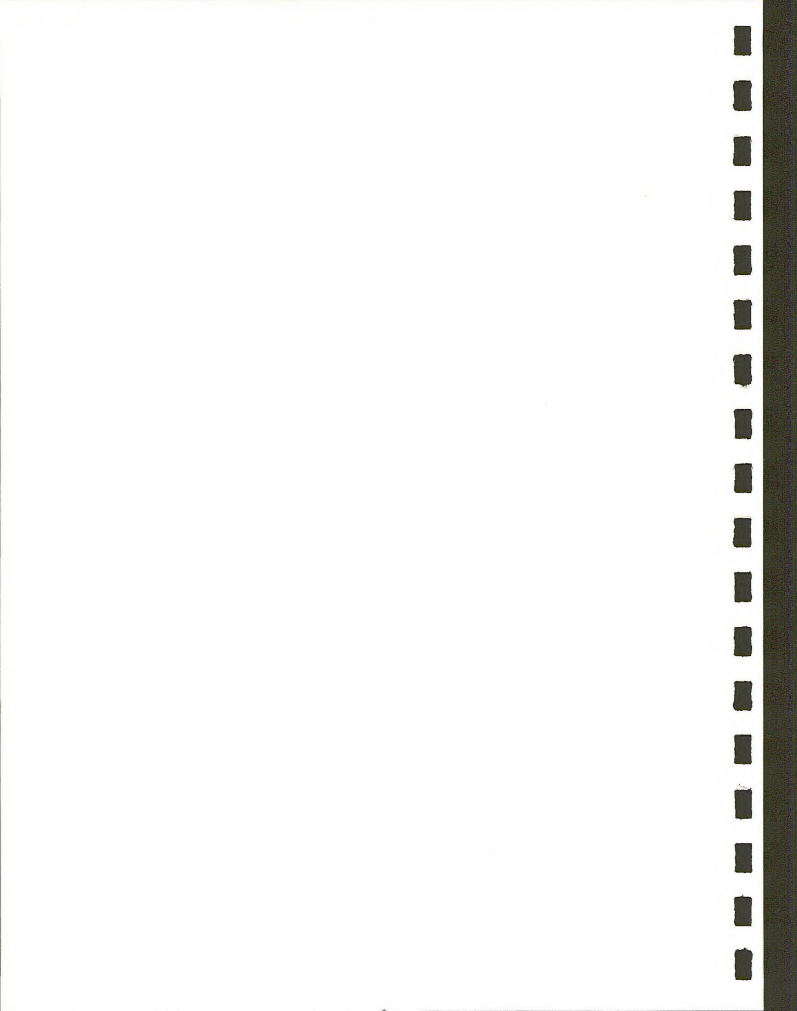


POWER LINE CONSTRUCTION:  
HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0.2	0	0
Mining	0.2	0	0
Construction	0.8	0	0
Manufacturing	6.3	0	0
Transportation, Communication & Utilities	1.0	0	0
Trade	20.8	0	0
Finance, Insurance & Real Estate	1.9	0	0
Services	8.7	0	0
Government	6.0	0	0
TOTAL	45.9	0	0



COAL MINE DEVELOPMENT:  
HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT  
Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	11.4	8.5	1.1
Mining	13.7	10.2	1.3
Construction	22.5	16.7	2.2
Manufacturing	171.0	127.0	16.4
Transportation, Communication & Utilities	115.3	85.6	11.0
Trade	572.4	425.3	54.8
Finance, Insurance & Real Estate	53.5	40.0	5.1
Services	188.0	139.6	18.0
Government	169.0	126.0	16.0
TOTAL	1316.8	978.9	125.9



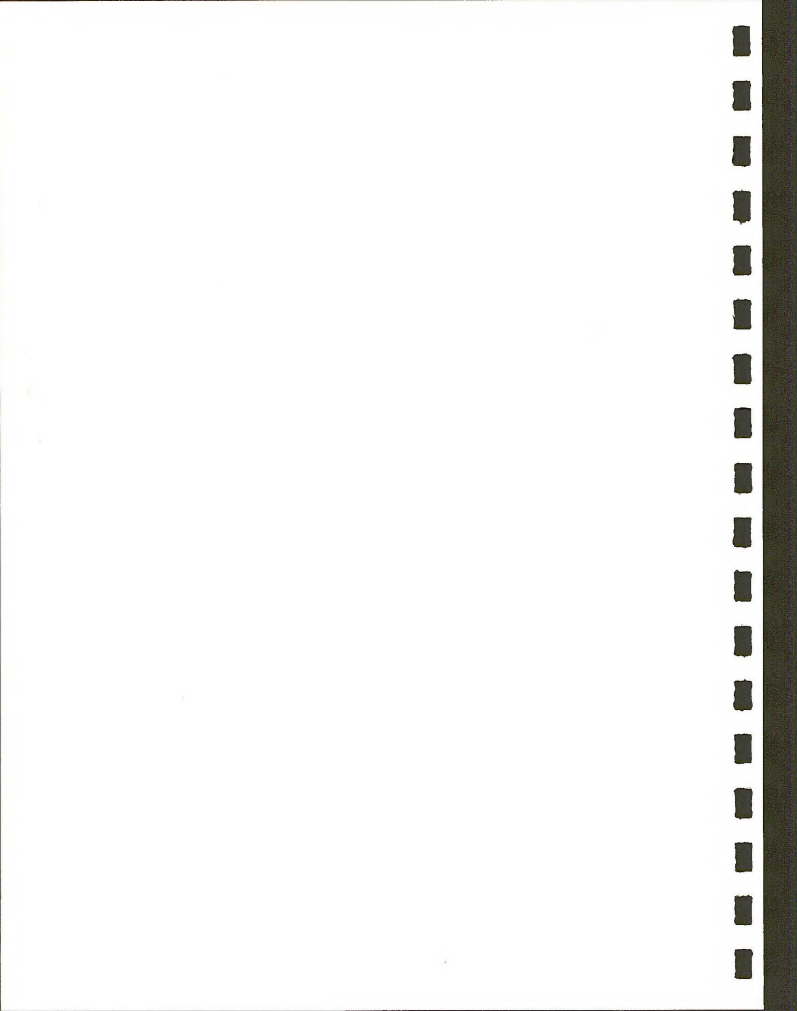
SURFACE COAL OPERATION:  
HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	2.9	11.1	16.6
Mining	2.3	9.0	13.5
Construction	19.4	74.6	111.0
Manufacturing	26.8	102.9	154.4
Transportation, Communication & Utilities	43.2	165.8	248.6
Trade	209.9	806.2	1209.0
Finance, Insurance & Real Estate	27.7	106.4	159.5
Services	96.8	371.7	557.4
Government	80.0	306.0	459.0
TOTAL	509.0	1953.7	2929.0





UNDERGROUND COAL OPERATION:  
HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0.5	3.6	9.9
Mining	0.3	2.0	5.3
Construction	2.1	14.6	39.5
Manufacturing	6.3	43.8	118.4
Transportation, Communication & Utilities	5.6	38.5	105.5
Trade	36.0	248.0	672.5
Finance, Insurance & Real Estate	4.1	28.6	77.0
Services	20.0	136.0	368.9
Government	15.0	101.0	273.0
TOTAL	89.9	616.1	1670.0



STAR LAKE RAILROAD CONSTRUCTION:  
HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	5.7	0	0
Mining	1.7	0	0
Construction	7.0	0	0
Manufacturing	29.8	0	0
Transportation, Communication & Utilities	57.7	0	0
Trade	180.6	0	0
Finance, Insurance & Real Estate	17.4	0	0
Services	77.8	0	0
Government	54.3	0	0
TOTAL	432.0	0	0



STAR LAKE RAILROAD OPERATIONS:  
HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT

Employment by Major Sector  
(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	0	0.3	0.3
Mining	0	0.2	0.2
Construction	0	4.7	4.7
Manufacturing	0	1.6	1.6
Transportation, Communication & Utilities	0	3.9	3.9
Trade	0	15.7	15.7
Finance, Insurance & Real Estate	0	2.4	2.4
Services	0	7.5	7.5
Government	0	6.0	6.0
TOTAL	0	42.3	42.3



TOTAL: HIGH LEVEL DEVELOPMENT SCENARIO

INDIRECT IMPACT

Employment by Major Sector

(selected years)

<u>Sector</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Agriculture	30.4	32.5	43.5
Mining	33.5	37.7	48.1
Construction	126.4	235.5	365.6
Manufacturing	356.4	371.1	458.0
Transportation, Communication & Utilities	376.7	496.1	710.0
Trade	1670.2	2120.0	3028.5
Finance, Insurance & Real Estate	180.8	259.7	384.6
Services	678.9	937.8	1438.5
Government	568.3	768.0	1149.0
TOTAL	8776.7	5258.4	7625.8





The impact associated with the public sector could be determined by the input-output modeling process, but because of widespread variations in the demand for and provision of public services and the jobs connected therewith, the input-output modeling process could yield unusable results.

In an area such as northwestern New Mexico many federal jobs are connected with or supply services to the Indian population; some of these activities in other areas of the country might be associated with the private sector or with state and local government. Therefore, for this project, the number of new jobs created in the government sector was determined from the marginal relationship between new non-agricultural jobs and government jobs as shown by Bureau of Economic Analysis regional information for the four counties in the study area. This relationship, based upon the Bureau of Economic Analysis figures, indicated that in the four-county area, approximately 7.9 percent of all new non-agricultural jobs within the area were government jobs. This factor was used to determine the number of new jobs supported on an annual basis by coal, power plant activity, and other related developments within the area.

#### TOTAL JOB IMPACT

The following eight pages list the total number of jobs supported (created) by coal mining, power plant activity, and related development for the period 1978-1990 for the area covered by the study. Four alternative scenarios were used to determine the level of impact and careful attention to the specific scenario should be exercised in reviewing the following tables.

#### PERSONAL INCOME

On the following page is listed the personal income generated directly and indirectly by the coal and related development for the years 1977 through 1990. The direct impact is calculated by payments to individuals associated with coal and related developments directly. The calculated number of personal income dollars associated with the indirect impact come from jobs associated with that impact. The private sector calculations are exclusive of the government sector and are based upon the results of the input-output modeling process. The government sector calculations are based upon the marginal effect on jobs determined through Bureau of Economic Analysis information. The actual dollar calculations take into account the average government wage paid in 1977. Finally, interest, rents and dividends are calculated as a percentage of other personal income generated in the area based again on Bureau of Economic Analysis data for the period 1970-1975 and estimated for 1977. Thus, all figures are for 1977 constant dollars.



NO ACTION ALTERNATIVE

JOBS CREATED AND SUPPORTED BY COAL MINING AND RELATED DEVELOPMENT  
(Includes power plant construction and operation)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>POWER PLANT CONSTRUCTION</b>													
Direct Jobs	826	851	545	177	0	0	0	0	0	0	0	0	0
Private, Indirect Jobs	602	620	397	129	0	0	0	0	0	0	0	0	0
Government Jobs	113	116	74	24	0	0	0	0	0	0	0	0	0
Total Jobs	1541	1587	1016	330	0	0	0	0	0	0	0	0	0
Annual New Jobs	1541	46	-571	-686	-330	0	0	0	0	0	0	0	0
<b>POWER PLANT OPERATION</b>													
Direct Jobs	220	220	330	330	439	439	439	439	439	439	439	439	439
Private, Indirect Jobs	279	279	418	418	556	556	556	556	556	556	556	556	556
Government Jobs	39	39	59	59	79	79	79	79	79	79	79	79	79
Total Jobs	538	538	807	807	1074	1074	1074	1074	1074	1074	1074	1074	1074
Annual New Jobs	538	0	269	0	264	0	0	0	0	0	0	0	0
<b>COAL MINE DEVELOPMENT</b>													
Direct Jobs	462	485	25	0	0	0	0	0	0	0	0	0	0
Private, Indirect Jobs	534	561	29	0	0	0	0	0	0	0	0	0	0
Government Jobs	79	82	4	0	0	0	0	0	0	0	0	0	0
Total Jobs	1075	1128	58	0	0	0	0	0	0	0	0	0	0
Annual New Jobs	1075	53	-1070	-58	0	0	0	0	0	0	0	0	0
<b>SURFACE COAL OPERATION</b>													
Direct Jobs	47	185	580	605	605	605	605	605	580	555	555	535	535
Private, Indirect Jobs	35	137	429	447	447	447	447	447	429	410	410	396	396
Government Jobs	6	25	80	83	83	83	83	83	80	76	76	73	73
Total Jobs	88	347	1089	1135	1135	1135	1135	1135	1089	1089	1041	1004	1004
Annual New Jobs	88	259	742	46	0	0	0	0	-46	-48	0	-37	0

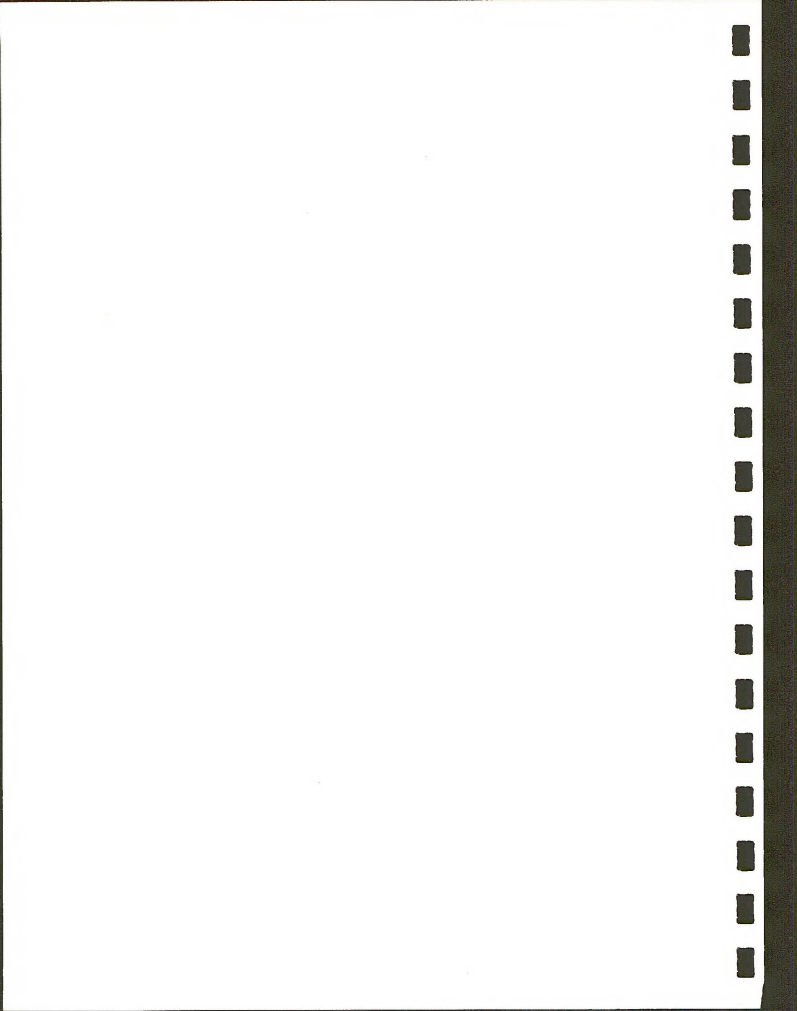
Source: Larry Adcock and Associates, 1978.



No Action Alternative  
Jobs Created and Supported by Coal Mining and Related Development  
Page 2

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>UNDERGROUND COAL OPERATION</b>													
Direct Jobs	0	0	110	130	220	270	300	300	300	300	300	300	300
Private, Indirect Jobs	0	0	75	88	149	183	204	204	204	204	204	204	204
Government Jobs	0	0	15	17	29	36	40	40	40	40	40	40	40
Total Jobs	0	0	200	235	398	489	544	544	544	544	544	544	544
Annual New Jobs	0	0	200	35	163	91	45	0	0	0	0	0	0
<b>TOTAL</b>													
Direct Jobs	1555	1741	1590	1242	1264	1314	1344	1344	1319	1294	1294	1274	1274
Private, Indirect Jobs	1450	1597	1348	1082	1152	1186	1207	1207	1189	1170	1170	1156	1156
Government Jobs	237	262	232	183	191	198	202	202	199	195	195	192	192
Total Jobs	3242	3600	3170	2507	2607	2698	2753	2753	2707	2659	2659	2622	2622
Annual New Jobs	3242	358	-430	-663	100	91	55	0	-46	-48	0	-37	0

Source: Larry Adcock and Associates, 1978.



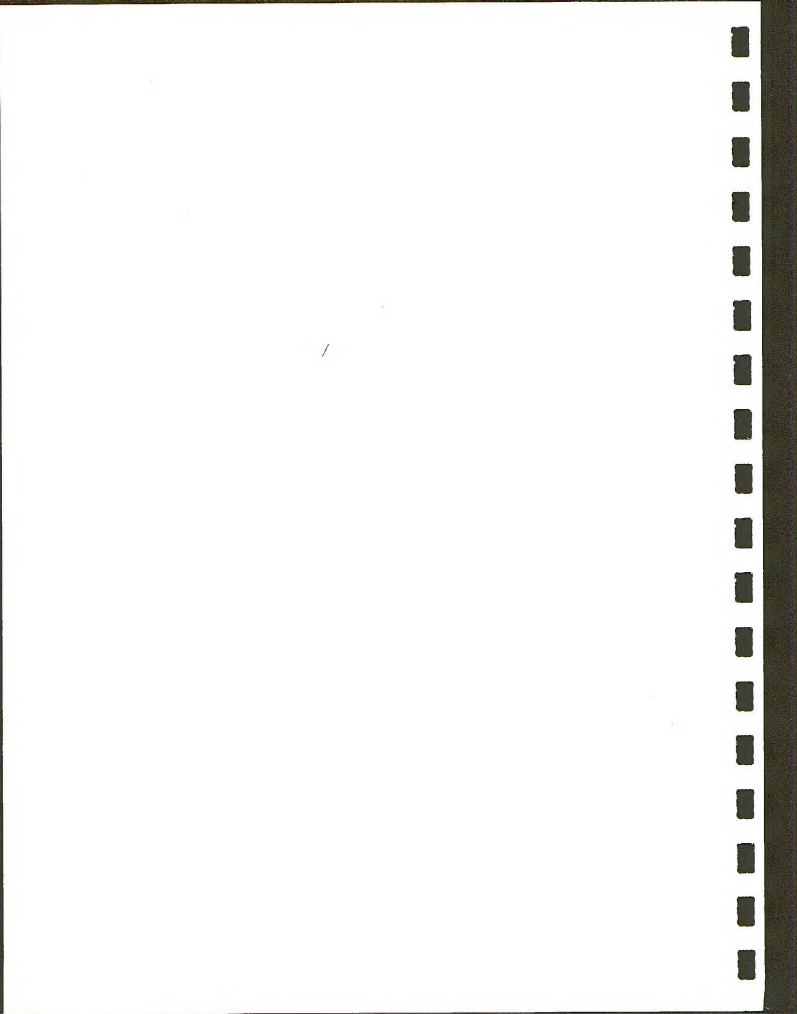
# PARTIAL ACTION ALTERNATIVE

JOBS CREATED AND SUPPORTED BY COAL MINING AND RELATED DEVELOPMENT  
(Includes power line construction and power plant construction and operation)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
POWER LINE CONSTRUCTION													
Direct Jobs	0	35	35	35	0	0	0	0	0	0	0	0	0
Private, Indirect Jobs	0	43	43	43	0	0	0	0	0	0	0	0	0
Government Jobs	0	6	6	6	0	0	0	0	0	0	0	0	0
Total Jobs	0	84	84	84	0	0	0	0	0	0	0	0	0
Annual New Jobs	0	84	0	0	-84	0	0	0	0	0	0	0	0
POWER PLANT CONSTRUCTION													
Direct Jobs	826	1041	1320	1582	925	0	90	775	1489	1910	1495	1950	1399
Private, Indirect Jobs	602	759	963	1154	675	0	66	565	1086	1393	1090	1422	1020
Government Jobs	113	142	180	216	126	0	12	106	203	261	204	266	191
Total Jobs	1541	1942	2463	2952	1726	0	168	1446	2778	3564	2789	3638	2610
Annual New Jobs	1541	401	521	489	-1226	-1726	168	1278	1332	786	-775	849	-1028
POWER PLANT OPERATION													
Direct Jobs	220	220	330	330	689	689	689	689	689	689	889	889	1139
Private, Indirect Jobs	279	279	418	418	873	873	873	873	873	873	1127	1127	1443
Government Jobs	39	39	59	59	123	123	123	123	123	123	159	159	204
Total Jobs	538	538	807	807	1685	1685	1685	1685	1685	1685	2175	2175	2786
Annual New Jobs	538	0	269	0	878	0	0	0	0	0	490	0	611
COAL MINE DEVELOPMENT													
Direct Jobs	462	635	225	195	0	0	0	0	0	0	0	0	95
Private, Indirect Jobs	534	735	260	226	0	0	0	0	0	0	0	0	110
Government Jobs	79	108	38	33	0	0	0	0	0	0	0	0	16
Total Jobs	1075	1478	523	454	0	0	0	0	0	0	0	0	221
Annual New Jobs	1075	403	-955	-69	-454	0	0	0	0	0	0	0	221

Source: Larry Adcock and Associates, 1978.

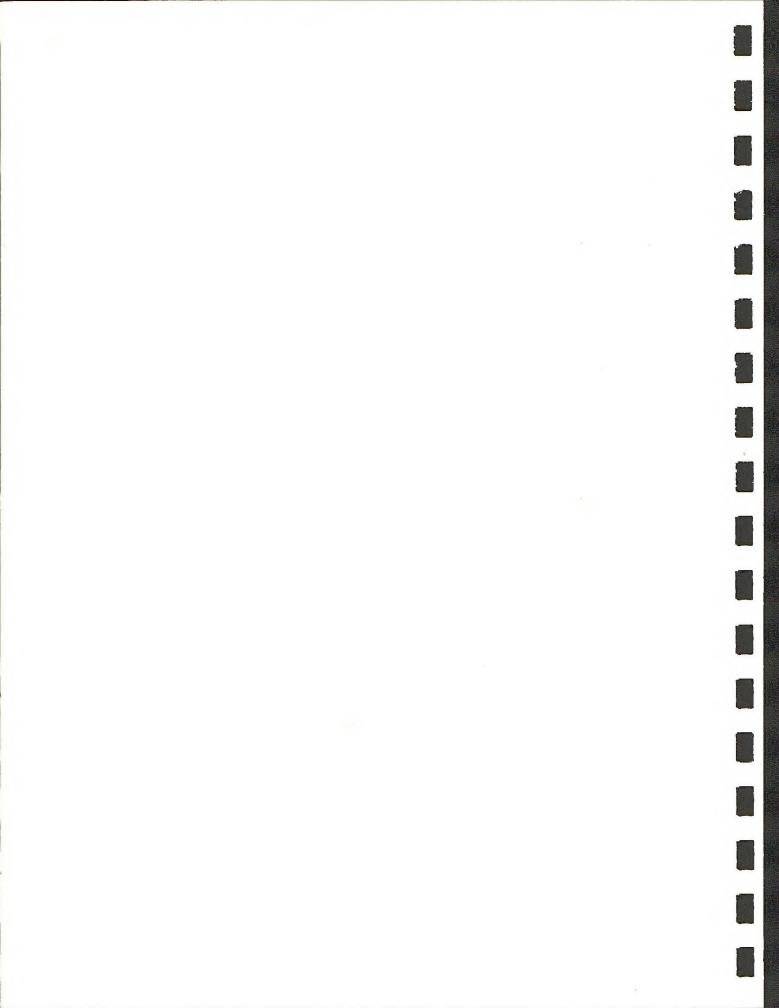




Partial Action Alternative  
Jobs Created and Supported by Coal Mining and Related Development  
Page 2

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>SURFACE COAL OPERATION</b>													
Direct Jobs	47	185	589	605	800	800	800	800	775	750	845	825	825
Private, Indirect Jobs	35	137	429	447	592	592	592	592	573	555	625	610	610
Government Jobs	6	25	80	83	110	110	110	110	106	103	116	113	113
Total Jobs	88	347	1089	1135	1502	1502	1502	1502	1454	1408	1586	1548	1548
Annual New Jobs	88	259	742	46	367	0	0	0	-48	-46	178	-38	0
<b>UNDERGROUND COAL OPERATION</b>													
Direct Jobs	0	0	110	130	220	270	300	300	300	300	300	300	300
Private, Indirect Jobs	0	0	75	88	149	183	204	204	204	204	204	204	204
Government Jobs	0	0	15	17	29	36	40	40	40	40	40	40	40
Total Jobs	0	0	200	235	398	489	544	544	544	544	544	544	544
Annual New Jobs	0	0	200	35	163	91	55	0	0	0	0	0	0
<b>TOTAL</b>													
Direct Jobs	1555	2116	2600	2877	2634	1759	1879	2564	3253	3649	3529	3964	3758
Private, Indirect Jobs	1450	1953	2188	2376	2289	1648	1735	2234	2736	3025	3046	3363	3387
Government Jobs	237	320	378	414	388	269	285	379	472	527	519	578	564
Total Jobs	3242	4389	5166	5667	5311	3676	3899	5177	6461	7201	7094	7905	7709
Annual New Jobs	3242	1147	777	501	-356	-1635	223	1278	1284	740	-107	811	-196

Source: Larry Adcock and Associates, 1978.

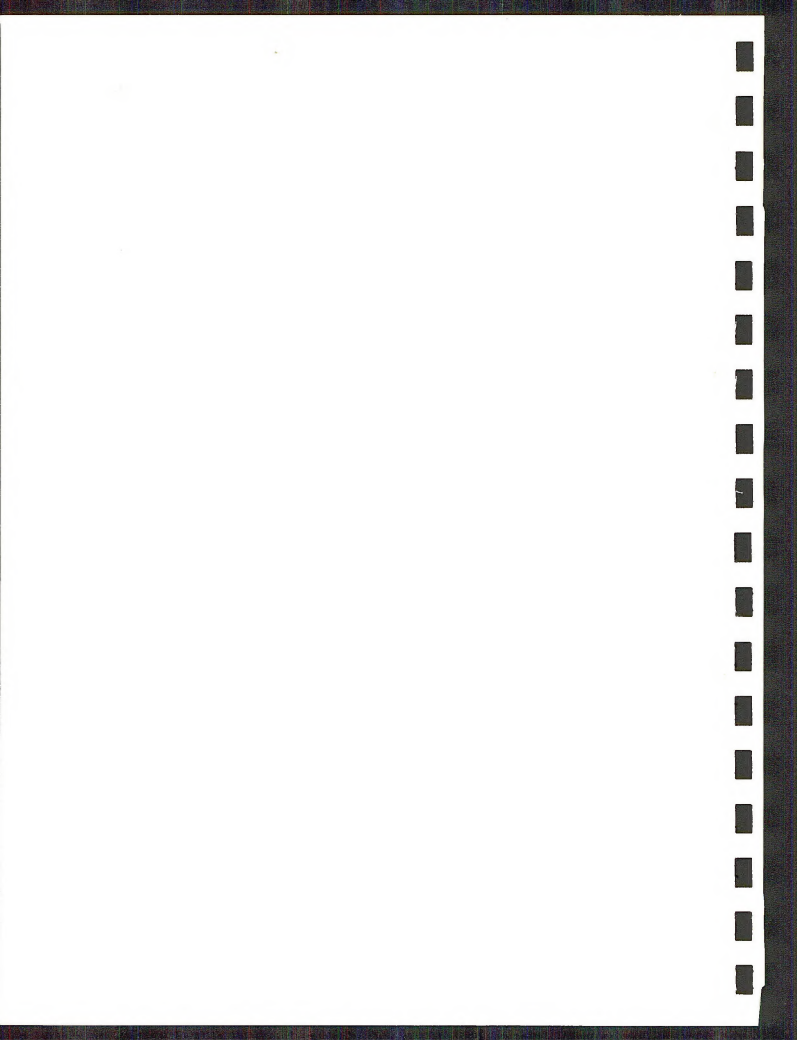


# PROPOSED ACTION

JOB<sup>S</sup> CREATED AND SUPPORTED BY COAL MINE AND RELATED DEVELOPMENT  
(Includes power line construction; power plant and railroad  
construction and operation)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
POWER LINE CONSTRUCTION													
Direct Jobs	0	35	35	35	0	35	35	0	0	0	0	0	0
Private, Indirect Jobs	0	43	43	43	0	43	43	0	0	0	0	0	0
Government Jobs	0	6	6	6	0	6	6	0	0	0	0	0	0
Total Jobs	0	84	84	84	0	84	84	0	0	0	0	0	0
Annual New Jobs	0	84	0	0	-84	84	0	-84	0	0	0	0	0
POWER PLANT CONSTRUCTION													
Direct Jobs	826	1041	1320	1582	925	0	90	775	1489	1910	1495	1950	1399
Private, Indirect Jobs	602	759	963	1154	675	0	66	565	1086	1393	1090	1422	1020
Government Jobs	113	142	180	216	126	0	12	106	203	261	204	266	191
Total Jobs	1541	1942	2463	2952	1726	0	168	1446	2778	3564	2789	3638	2610
Annual New Jobs	1541	401	521	489	-1226	-1726	168	1278	1332	786	-775	849	-1028
POWER PLANT OPERATION													
Direct Jobs	220	220	330	330	689	689	689	689	689	689	889	889	1139
Private, Indirect Jobs	279	279	418	418	873	873	873	873	873	873	1127	1127	1443
Government Jobs	39	39	59	59	123	123	123	123	123	123	159	159	204
Total Jobs	538	538	807	807	1685	1685	1685	1685	1685	1685	2175	2175	2786
Annual New Jobs	538	0	269	0	878	0	0	0	0	0	490	0	611
COAL MINE DEVELOPMENT													
Direct Jobs	462	749	541	592	265	367	0	0	0	0	101	0	95
Private, Indirect Jobs	534	866	626	685	307	425	0	0	0	0	117	0	110
Government Jobs	79	128	92	101	45	63	0	0	0	0	17	0	16
Total Jobs	1075	1743	1259	1378	617	855	0	0	0	0	235	0	221
Annual New Jobs	1075	668	-484	119	-761	238	-855	0	0	0	235	-235	221

Source: Larry Adcock and Associates, 1978



Proposed Action  
Jobs Created and Supported by Coal Mine and Related Development  
Page 2

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>SURFACE COAL OPERATION</b>													
Direct Jobs	47	185	580	886	1084	1084	1454	1554	1579	1584	1679	1659	1659
Private, Indirect Jobs	35	137	429	655	802	802	1075	1149	1168	1171	1242	1227	1227
Government Jobs	6	25	80	122	149	149	200	213	217	218	231	228	228
Total Jobs	88	347	1089	1663	2035	2035	2729	2916	2964	2973	3152	3114	3114
Annual New Jobs	88	259	742	574	372	0	694	187	48	9	179	-38	0
<b>UNDERGROUND COAL OPERATION</b>													
Direct Jobs	0	0	110	130	220	270	300	300	300	300	300	300	300
Private, Indirect Jobs	0	0	75	88	149	183	204	204	204	204	204	204	204
Government Jobs	0	0	15	17	29	36	40	40	40	40	40	40	40
Total Jobs	0	0	200	235	398	489	544	544	544	544	544	544	544
Annual New Jobs	0	0	200	35	163	91	55	0	0	0	0	0	0
<b>RAILROAD CONSTRUCTION</b>													
Direct Jobs	25	155	310	262	0	0	0	0	0	0	0	0	0
Private, Indirect Jobs	30	189	378	319	0	0	0	0	0	0	0	0	0
Government Jobs	4	27	54	46	0	0	0	0	0	0	0	0	0
Total Jobs	59	371	742	627	0	0	0	0	0	0	0	0	0
Annual New Jobs	59	312	371	-115	-627	0	0	0	0	0	0	0	0
<b>RAILROAD OPERATION</b>													
Direct Jobs	0	0	0	38	38	38	38	38	38	38	38	38	38
Private, Indirect Jobs	0	0	0	36	36	36	36	36	36	36	36	36	36
Government Jobs	0	0	0	6	6	6	6	6	6	6	6	6	6
Total Jobs	0	0	0	80	80	80	80	80	80	80	80	80	80
Annual New Jobs	0	0	0	80	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>													
Direct Jobs	1580	2385	3226	3855	3221	2483	2606	3356	4095	4521	4502	4836	4630
Private, Indirect Jobs	1480	2273	2932	3398	2842	2362	2297	2827	3367	3677	3816	4016	4040
Government Jobs	241	367	486	573	478	383	387	488	589	648	657	699	685
Total Jobs	3301	5025	6644	7826	6541	5228	5290	6671	8051	8846	8975	9551	9355
Annual New Jobs	3301	1724	1619	1182	-1285	-1313	62	1381	1380	795	129	576	-196



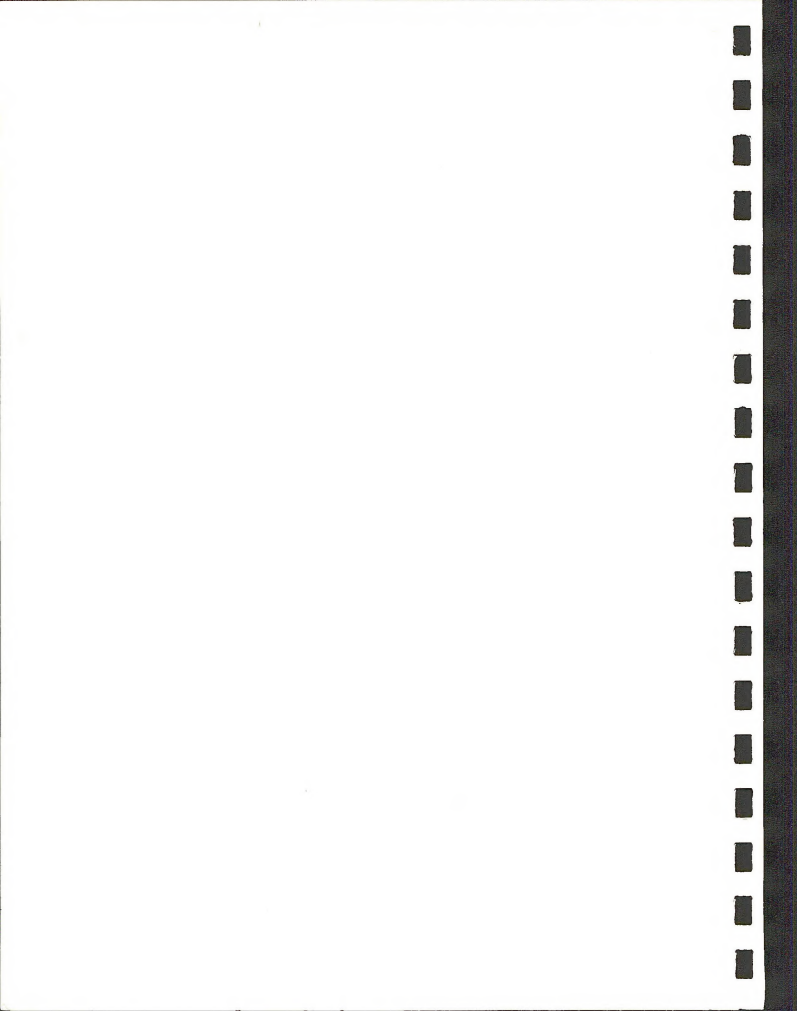
# FULL DEVELOPMENT SCENARIO

JOBS CREATED AND SUPPORTED BY COAL MINING AND RELATED DEVELOPMENT  
(Includes power line construction; power plant and railroad construction and operation)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>POWER LINE CONSTRUCTION</b>													
Direct Jobs	0	35	35	35	0	35	35	0	0	0	0	0	0
Private, Indirect Jobs	0	43	43	43	0	43	43	0	0	0	0	0	0
Government Jobs	0	6	6	6	0	6	6	0	0	0	0	0	0
Total Jobs	0	84	84	84	0	84	84	0	0	0	0	0	0
Annual New Jobs	0	84	0	0	-84	84	0	-84	0	0	0	0	0
<b>POWER PLANT CONSTRUCTION</b>													
Direct Jobs	826	1041	1320	1582	925	0	90	775	1489	1910	1495	1950	1399
Private, Indirect Jobs	602	759	963	1154	674	0	66	565	1086	1393	1090	1422	1020
Government Jobs	113	142	180	216	126	0	12	106	203	261	204	266	191
Total Jobs	1541	1942	2463	2952	1725	0	168	1446	2778	3564	2789	3638	2610
Annual New Jobs	1541	401	521	489	-1227	-1725	168	1278	1332	786	-775	849	-1028
<b>POWER PLANT OPERATION</b>													
Direct Jobs	220	220	330	330	689	689	689	689	689	689	889	889	1139
Private, Indirect Jobs	279	279	418	418	873	873	873	873	873	873	1127	1127	1443
Government Jobs	39	39	59	59	123	123	123	123	123	123	159	159	204
Total Jobs	538	538	807	807	1685	1685	1685	1685	1685	1685	2175	2175	2786
Annual New Jobs	538	0	269	0	878	0	0	0	0	0	490	0	611
<b>COAL MINE DEVELOPMENT</b>													
Direct Jobs	537	945	992	1262	1260	1172	601	737	63	0	101	0	95
Private, Indirect Jobs	621	1093	1148	1460	1458	1356	695	853	73	0	117	0	110
Government Jobs	91	161	169	215	215	200	102	126	11	0	17	0	16
Total Jobs	1249	2199	2309	2937	2933	2728	1398	1716	147	0	235	0	221
Annual New Jobs	1249	950	110	628	-4	-205	-1330	318	-1569	-147	235	-235	221

Source: Larry Adcock and Associates, 1978.

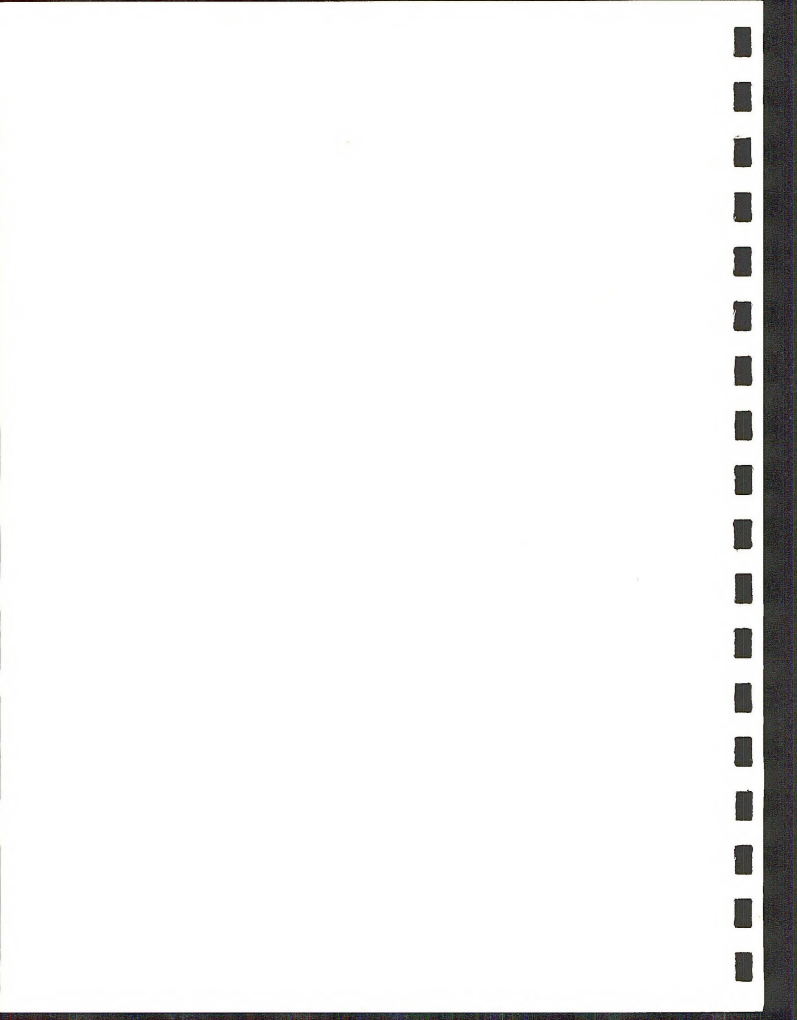




Full Development Scenario  
Jobs Created and Supported by Coal Mining and Related Development  
Page 2

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>SURFACE COAL OPERATION</b>													
Direct Jobs	47	185	580	886	1214	1378	2128	2228	2481	2516	2611	2591	3341
Private, Indirect Jobs	35	137	429	655	889	1019	1574	1648	1835	1861	1931	1916	2470
Government Jobs	6	25	80	122	167	189	292	306	341	346	359	356	459
Total Jobs	88	347	1089	1663	2270	2586	3994	4182	4657	4723	4901	4863	6270
Annual New Jobs	88	259	742	574	607	316	1408	188	475	66	178	-38	1407
<b>UNDERGROUND COAL OPERATION</b>													
Direct Jobs	0	0	110	130	220	730	760	760	1410	1760	1760	1760	2060
Private, Indirect Jobs	0	0	75	88	149	495	515	515	956	1194	1194	1194	1397
Government Jobs	0	0	15	17	29	97	101	101	187	233	233	233	273
Total Jobs	0	0	200	235	398	1322	1376	1376	2553	3187	3187	3187	3730
Annual New Jobs	0	0	200	35	163	924	54	0	1177	634	0	0	543
<b>RAILROAD CONSTRUCTION</b>													
Direct Jobs	25	155	310	262	0	0	0	0	0	0	0	0	0
Private, Indirect Jobs	30	189	378	319	0	0	0	0	0	0	0	0	0
Government Jobs	4	27	54	46	0	0	0	0	0	0	0	0	0
Total Jobs	59	371	742	627	0	0	0	0	0	0	0	0	0
Annual New Jobs	59	312	371	-115	-627	0	0	0	0	0	0	0	0
<b>RAILROAD OPERATION</b>													
Direct Jobs	0	0	0	38	38	38	38	38	38	38	38	38	38
Private, Indirect Jobs	0	0	0	36	36	36	36	36	36	36	36	36	36
Government Jobs	0	0	0	6	6	6	6	6	6	6	6	6	6
Total Jobs	0	0	0	80	80	80	80	80	80	80	80	80	80
Annual New Jobs	0	0	0	80	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>													
Direct Jobs	1655	2581	3677	4525	4346	4042	4341	5227	6170	6913	6894	7228	8072
Private, Indirect Jobs	1567	2500	3454	4173	4079	3822	3802	4490	4859	5357	5495	5695	6476
Government Jobs	253	400	563	687	666	621	642	768	871	969	978	1020	1149
Total Jobs	3475	5481	7694	9385	9091	8485	8785	10485	11900	13239	13367	13943	15697
Annual New Jobs	3475	2006	2213	1691	-294	-606	300	1700	1415	1339	128	576	1754

Source: Larry Adcock and Associates, 1978.



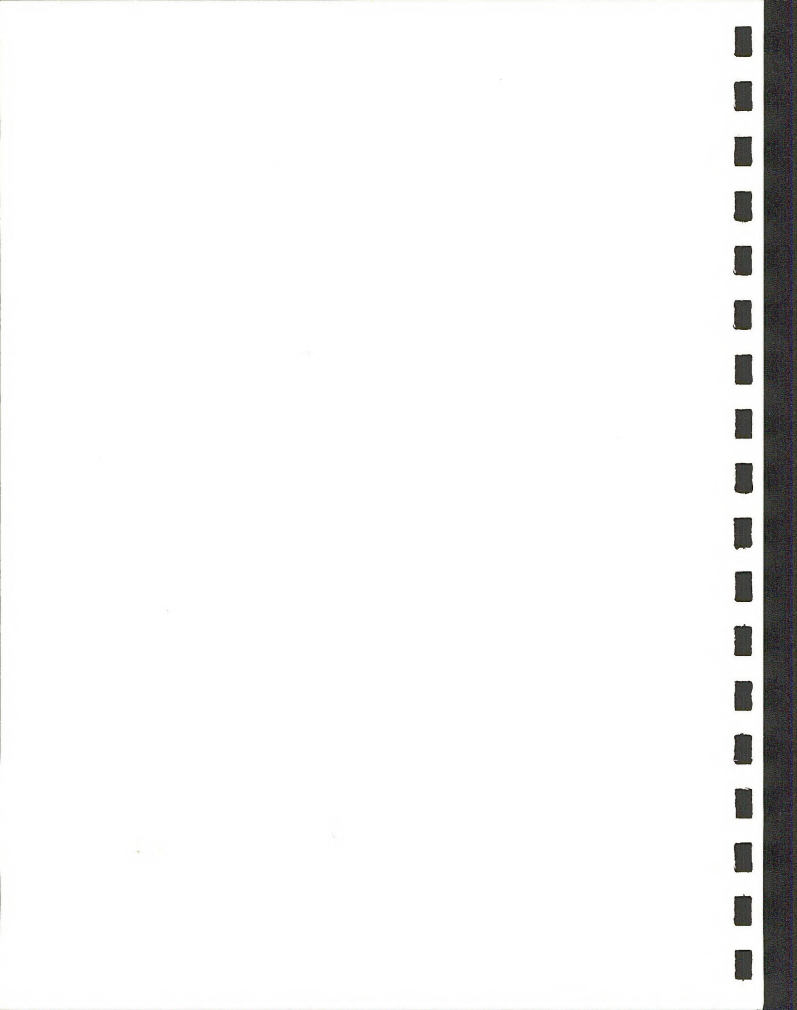
ESTIMATED ANNUAL PERSONAL INCOME GENERATED FROM COAL AND RELATED DEVELOPMENT

ES REGION, WITH PROPOSED ACTIONS (By Source)\*

Year	Private Sector			Government Sector	Dividends, Interest and Rents	Annual Total Personal Income
	Direct	Indirect	Total			
1978	29,700.5	13,430.9	43,131.4	2,276.2	4,041.3	49,448.9
1979	44,776.9	20,506.0	65,282.9	3,466.3	6,118.7	74,867.9
1980	60,572.2	26,505.8	87,078.0	4,590.3	8,158.5	99,826.8
1981	72,283.9	30,583.4	102,867.3	5,412.0	9,636.9	117,916.2
1982	60,311.7	26,298.5	86,610.2	4,514.7	8,110.1	99,235.0
1983	46,307.9	22,237.0	68,544.9	3,617.4	6,422.4	78,584.7
1984	48,622.2	21,598.4	70,220.6	3,655.2	6,574.9	80,450.7
1985	62,768.2	26,160.2	88,928.4	4,609.2	8,324.8	101,862.4
1986	76,731.2	30,804.0	107,535.2	5,563.1	10,065.7	123,164.0
1987	84,783.6	33,467.3	118,250.9	6,120.4	11,069.0	135,440.3
1988	84,358.5	35,168.2	119,526.7	6,205.4	11,190.2	136,922.3
1989	90,713.7	36,834.3	127,548.0	6,602.1	11,939.4	146,089.5
1990	86,787.2	37,628.4	124,415.6	6,469.8	11,648.8	142,534.2
TOTALS	848,717.7	361,222.4	1,209,940.1	63,102.1	113,300.7	1,386,342.9

\* Constant 1977 dollars.

Source: Larry Adcock and Associates, 1977.

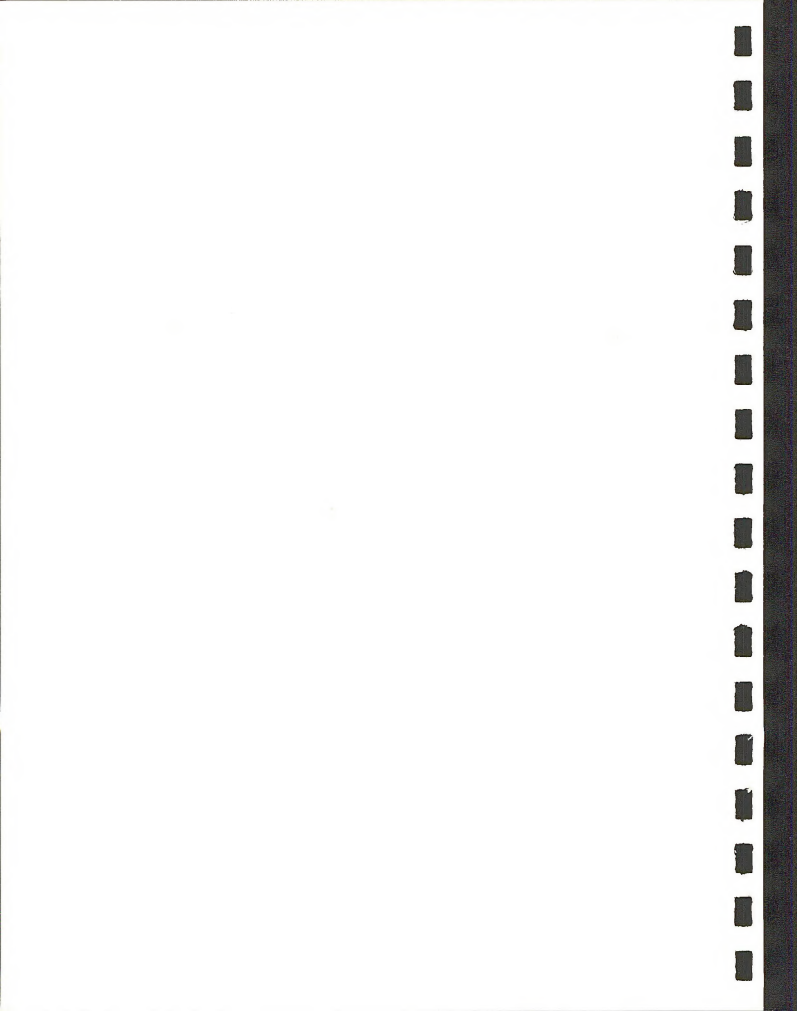


# FULL DEVELOPMENT SCENARIO

JOBS CREATED AND SUPPORTED BY COAL MINING AND RELATED DEVELOPMENT  
(Includes power line construction; power plant and railroad construction and operation)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>POWER LINE CONSTRUCTION</b>													
Direct Jobs	0	35	35	35	0	35	35	0	0	0	0	0	0
Private, Indirect Jobs	0	43	43	43	0	43	43	0	0	0	0	0	0
Government Jobs	0	6	6	6	0	6	6	0	0	0	0	0	0
Total Jobs	0	84	84	84	0	84	84	0	0	0	0	0	0
Annual New Jobs	0	84	0	0	-84	84	0	-84	0	0	0	0	0
<b>POWER PLANT CONSTRUCTION</b>													
Direct Jobs	826	1041	1320	1582	925	0	90	775	1489	1910	1495	1950	1399
Private, Indirect Jobs	602	759	963	1154	674	0	66	565	1086	1393	1090	1422	1020
Government Jobs	113	142	180	216	126	0	12	106	203	261	204	266	191
Total Jobs	1541	1942	2463	2952	1725	0	168	1446	2778	3564	2789	3638	2610
Annual New Jobs	1541	401	521	489	-1227	-1725	168	1278	1332	786	-775	849	-1028
<b>POWER PLANT OPERATION</b>													
Direct Jobs	220	220	330	330	689	689	689	689	689	689	889	889	1139
Private, Indirect Jobs	279	279	418	418	873	873	873	873	873	873	1127	1127	1443
Government Jobs	39	39	59	59	123	123	123	123	123	123	159	159	204
Total Jobs	538	538	807	807	1685	1685	1685	1685	1685	1685	2175	2175	2786
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Total Jobs	1249	2199	2309	2937	2933	2728	1398	1716	147	0	235	0	221
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Full Development Scenario  
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	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>SURFACE COAL OPERATION</b>													
Direct Jobs	47	185	580	886	1214	1378	2128	2228	2481	2516	2611	2591	3341
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<b>UNDERGROUND COAL OPERATION</b>													
Direct Jobs	0	0	110	130	220	730	760	760	1410	1760	1760	1760	2060
Private, Indirect Jobs	0	0	75	88	149	495	515	515	956	1194	1194	1194	1397
Government Jobs	0	0	15	17	29	97	101	101	187	233	233	233	273
Total Jobs	0	0	200	235	398	1322	1376	1376	2553	3187	3187	3187	3730
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<b>RAILROAD CONSTRUCTION</b>													
Direct Jobs	25	155	310	262	0	0	0	0	0	0	0	0	0
Private, Indirect Jobs	30	189	378	319	0	0	0	0	0	0	0	0	0
Government Jobs	4	27	54	46	0	0	0	0	0	0	0	0	0
Total Jobs	59	371	742	627	0	0	0	0	0	0	0	0	0
Annual New Jobs	59	312	371	-115	-627	0	0	0	0	0	0	0	0
<b>RAILROAD OPERATION</b>													
Direct Jobs	0	0	0	38	38	38	38	38	38	38	38	38	38
Private, Indirect Jobs	0	0	0	36	36	36	36	36	36	36	36	36	36
Government Jobs	0	0	0	6	6	6	6	6	6	6	6	6	6
Total Jobs	0	0	0	80	80	80	80	80	80	80	80	80	80
Annual New Jobs	0	0	0	80	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>													
Direct Jobs	1655	2581	3677	4525	4346	4042	4341	5227	6170	6913	6894	7228	8072
Private, Indirect Jobs	1567	2500	3454	4173	4079	3822	3802	4490	4859	5357	5495	5695	6476
Government Jobs	253	400	563	687	666	621	642	768	871	969	978	1020	1149
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Annual New Jobs	3475	2006	2213	1691	-294	-606	300	1700	1415	1339	128	576	1754

Source: Larry Adcock and Associates, 1978.





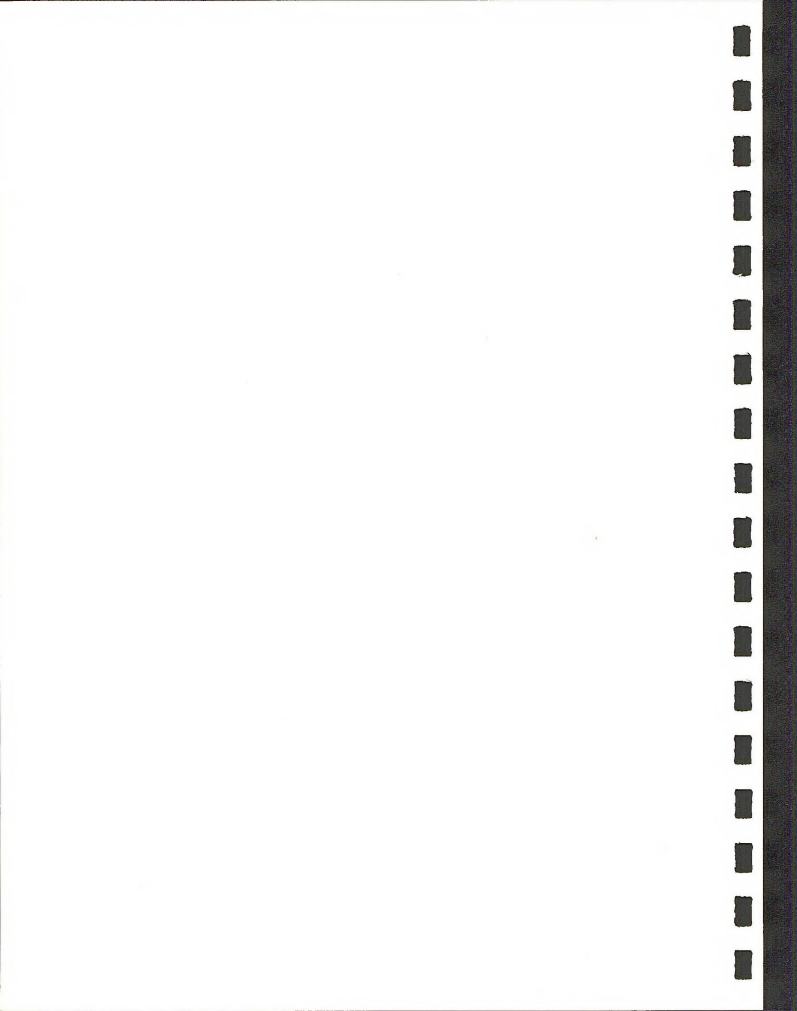
ESTIMATED ANNUAL PERSONAL INCOME GENERATED FROM COAL AND RELATED DEVELOPMENT

ES REGION, WITH PROPOSED ACTIONS (By Source) \*

Year	Private Sector			Government Sector	Dividends, Interest and Rents	Annual Total Personal Income
	Direct	Indirect	Total			
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1979	44,776.9	20,506.0	65,282.9	3,466.3	6,118.7	74,867.9
1980	60,572.2	26,505.8	87,078.0	4,590.3	8,158.5	99,826.8
1981	72,283.9	30,583.4	102,867.3	5,412.0	9,636.9	117,916.2
1982	60,311.7	26,298.5	86,610.2	4,514.7	8,110.1	99,235.0
1983	46,307.9	22,237.0	68,544.9	3,617.4	6,422.4	78,584.7
1984	48,622.2	21,598.4	70,220.6	3,655.2	6,574.9	80,450.7
1985	62,768.2	26,160.2	88,928.4	4,609.2	8,324.8	101,862.4
1986	76,731.2	30,804.0	107,535.2	5,563.1	10,065.7	123,164.0
1987	84,783.6	33,467.3	118,250.9	6,120.4	11,069.0	135,440.3
1988	84,358.5	35,168.2	119,526.7	6,205.4	11,190.2	136,922.3
1989	90,713.7	36,834.3	127,548.0	6,602.1	11,939.4	146,089.5
1990	86,787.2	37,628.4	124,415.6	6,469.8	11,648.8	142,534.2
TOTALS	848,717.7	361,222.4	1,209,940.1	63,102.1	113,300.7	1,386,342.9

\* Constant 1977 dollars.

Source: Larry Adcock and Associates, 1977.



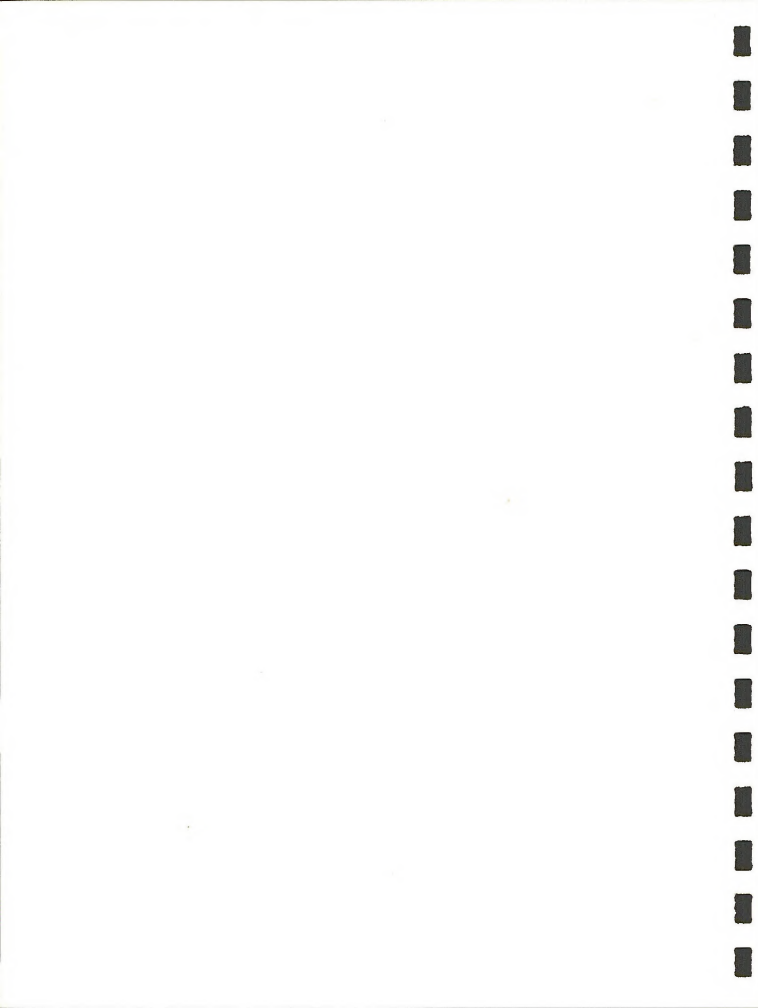
## APPENDIX C

### AN OUTLINE OF KEY INFORMANT INTERVIEWING AND SOCIOCULTURAL METHODOLOGIES

In June, July and August of 1977, Harbridge House, Inc., interviewed 110 residents of northwestern New Mexico to obtain data for an environmental statement. Interviews were designed to supply information for analysis of social and cultural characteristics. Key informants were interviewed in order to obtain the range of values, norms, and beliefs which characterize their communities. Interviewees afforded us an indication of those issues and feelings which are most central to the lives of individuals and groups in the ES Region, as well as suggested how residents perceive themselves as individuals and as members of the community.

The selection of key informants in the ES Region centered upon the compilation of a list of potential interviewees from various sources within the community. These sources were contacted by telephone and in person. One initial approach was to ascertain the formal, political, and social organization in the locality and to contact key officials. These persons then suggested other potential key informants, as well as outlined the informal organizations and interest groups within the community, in which some of these newly named individuals were prominent. Representatives of such informal leaders and decision-makers in the area, such as prominent landholders, ranchers, businessmen, and civic leaders who are often highly integrated into the patterns of information flow in the community, and are articulate spokespeople of local values and concerns, were included. As each individual was contacted, he/she was asked to suggest additional names of likely key informants. As the process of contacting community leaders continued, a "snowballing" effect occurred and an extensive list of prospective interviewees was developed. This procedure of contacting community leaders and asking for the names of credible and respected group leaders and members, and for a listing of significant social issues is called "judgmental sampling." This process continued until no new names or issues were suggested. (An authority on the subject of judgmental sampling and its external validity on both professional and academic levels is Norman K. Denzin, The Research Act: A Theoretical Introduction to Socioeconomic Methods, New York: Aldine Publishing Co., 1970.)

From the list of potential key informants thus obtained, a cross section was then taken of those contacts who were representative of the diverse groups and interests within the community, and who were anticipated to yield the most valid and detailed responses. These individuals were then interviewed as key informants in the ultimate



Harbridge House survey. Harbridge House implemented orally, a memorized instrument. There were no written questionnaires and no note-taking during interviews. Additionally, questions were open-ended and encouraged personal monologues about communities and developments in the region. However, interviews also included more limited kinds of questioning that focused upon selection of responses from a range (e.g., negative, neutral, positive). Following the interviews and in private, researchers recorded the types of responses received.

Some questions used semantic differential design, a technique which is also called complementary opposition of adjective pairs, including asking the subject to rate a given concept on a series of 7-point, bipolar rating scales. Any concept, whether it is a political issue, a person, an institution, or a work of art, can be rated on a 7-point scale as follows (as shown, this unilineal paradigm is assigned numbers):

VERY	QUITE	SLIGHTLY	NEUTRAL	SLIGHTLY	QUITE	VERY
1	2	3	4	5	6	7

This particular technique has certain advantages. First, it deals primarily with individual attitudes, particularly if administered in a closed situation (no other informants present). Second, the interviewer is quite able to code the informant's words (the interviewer can memorize a numerical rating and later record a number which has all the obvious advantages that are inherent with such symbols). Next, this design acts as an appropriate supplement to other possible designs and it permits great flexibility in programming material. Finally, a critical advantage is the ease of response by informants.



## INFORMATION FOR ALL INTERVIEWERS

Before we discuss the procedures to be followed when doing the interviews, I want to cover some routine matters. First, the sheets you have been given are to be used to keep track of your time for payment, and your mileage for reimbursement. Your hours should be indicated for each day in the appropriate space. Do not fill in the project number, we will do that later. At the bottom half of the sheet, under "Expenses" write your mileage - at \$.15 per mile. I will go over the time sheet with you; if you have any questions when you begin to fill it out, call me, I'll give you a list of numbers where I can be reached.

I plan to contact each of you regularly during the course of interviewing. If you have any comments, problems, questions, please discuss them with me when I see you. At the end of the project I will collect all your interview forms, and your time sheets. You will be sent a check for your work and mileage in a week or two. If you move from the address you put on the top of the time sheet, or if you don't receive a check within about two weeks, call me at (800) 225-7642 ext. 407.

We are assuming that you will all work an eight-hour day - excluding lunch. You will be paid for your time traveling to an interview, doing the interview, and writing it up. You will also be paid for your time spent being trained, or with me.

Now, about the interview procedure. You have been given an introductory statement. Please memorize it and repeat it to each interviewee. You may put it slightly differently, but do not change the content, you MUST give the interviewee all the information in the introduction. If people refuse to be interviewed, make a note of their refusal. If they're not at home, indicate that and visit them later. Do not visit people more than twice unless they are located along your route - do not go out of your way for any one interviewee more than twice.

The interview is short because you must memorize it, you must also remember the answers and write them down after the interview - you must write NOTHING down during the interview. I know it is difficult to remember everything people say, but try to remember all the points they discussed and their responses to all the questions. If you do not clearly remember an answer, give a general description and indicate that you do not remember the individual's exact words. Use \*'s to indicate how close your written answer is to the response. For example, if a person gives a 10 minute response to a question, summarize the feelings, the issues which most affected them, and the general tone of the discussion. Remember as much of the response as possible. Then, put a \* if your answer is very close to the response, two (\*\*) if you think you may have missed a few points, and three (\*\*\*) if you missed a great deal. DO NOT write down ANYTHING you are not sure of. It is much better to leave out a part of their response than to write down something they did not say.





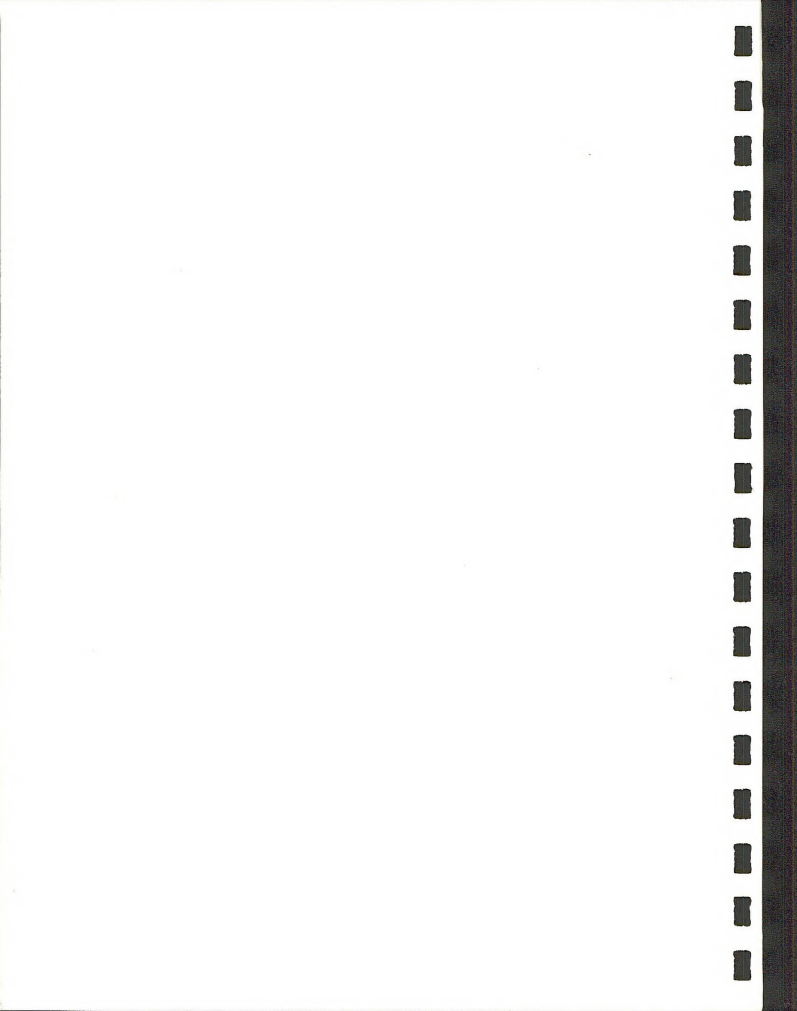
If the interview was not in English, indicate at the top of the form the language the interview took place in, and translate the answers into English on the sheet. PLEASE WRITE CLEARLY. If there is not enough space on the interview sheet, use additional pages. It is difficult to read another person's handwriting, so please use plenty of space and write clearly.

We want to get as many interviews as possible, but we do not want to antagonize anyone. If people refuse to answer your questions, ask them if they would answer one or two, if they agree, ask the ones which are circled. If they refuse to answer any questions, thank them and leave. Do not pressure them beyond emphasizing that their opinions are important and they will not be connected with the interview in any way and will not be bothered again.

If any problems arise in the course of the interview, if the person gets angry, refuses to answer a question, doesn't understand a question, or if anything unusual happens, make a separate note and discuss it with me. Do not force people to answer a question they object to. For example, if people refuse or are hesitant to tell you their ethnic background, pass over it. However, for that question, as well as the questions about age and income, write down your best guess and indicate that they did not respond but that you are guessing. Other questions which they object to - pass over and indicate they refused to respond.

We will go over the interview form in greater detail, I have simply summarized some of the most important procedures above. The most important thing to remember is BE POLITE. The interviewees are doing us a favor by answering our questions. Do nothing to antagonize them, and do not give a personal opinion at any time. We want their opinions and we want to leave them with a good feeling toward us. Be friendly, chat, but please do not say anything which will influence their opinion in any way.

Finally, be sure to ask all people you contact - even if they refuse to be interviewed - if they can recommend anyone else who is particularly knowledgeable about the community, has strong opinions, or is influential in the area. Be sure to get that person's or persons' name and address. If you must, you make ask if you may write that information down. This is very important because if we do not get recommendations, we cannot do any more interviews.



RESPONSES: NORTHWESTERN NEW MEXICO COAL, JUNE-NOVEMBER, 1977

Characteristics of Respondents: All

Number of Respondents: 110

Distribution of Respondents: McKinley, Sandoval, San Juan and Valencia Counties

1. How would you rate this area as a place in which to live?

Above Average	( 66 )	Below Average	( 7 )
Average	( 34 )	No response	( 3 )

2. How do you feel about the people who live around here?

Very Positive	( 47 )	Neutral	( 12 )	Very Negative	( 0 )
Positive	( 45 )	Negative	( 3 )	No Response	( 3 )

3. What do you like most about this area and this community?

The land	( 55 )	Climate	( 16 )
The people	( 62 )	Recreational activities	( 9 )
Small-town atmosphere	( 6 )	Other	( 2 )
Pace of life	( 10 )	No response	( 9 )
Business opportunities	( 9 )		
Employment opportunities	( 10 )		
Schools	( 9 )		

4. What do you like least about this area and this community?

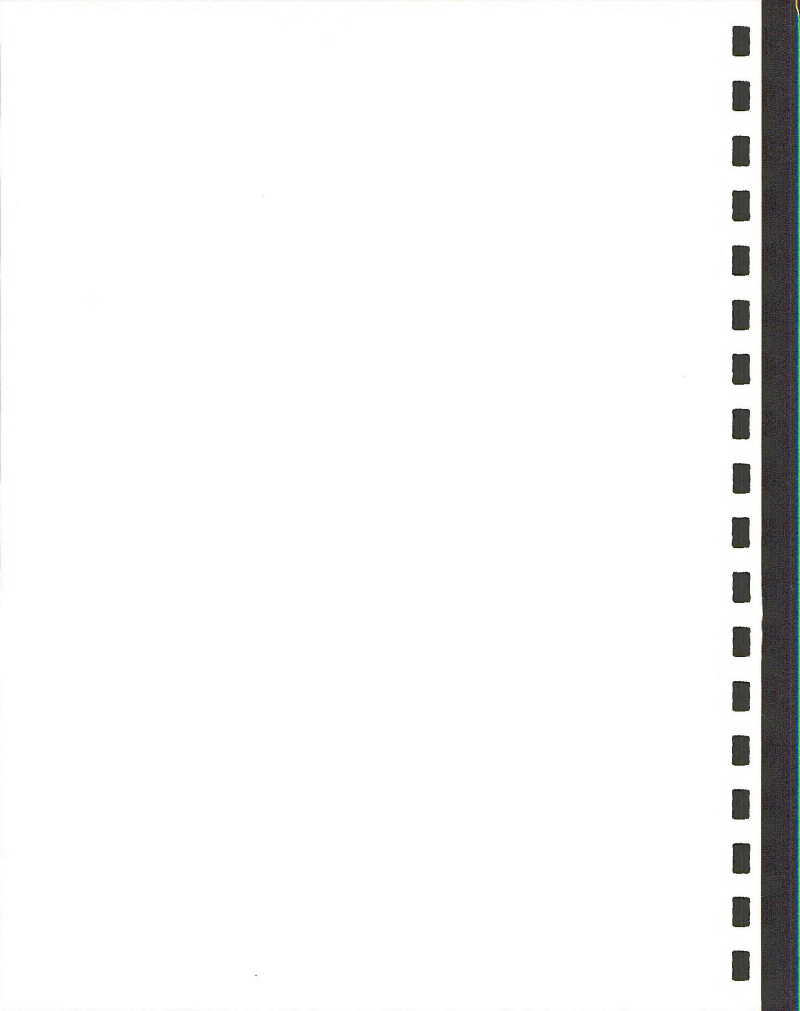
Isolation from major cities	( 12 )	Lack of concerted planning	( 5 )
Poor road conditions	( 6 )	Lack of land for development	( 2 )
Poor public services	( 7 )	Climate	( 4 )
Shortage of housing	( 4 )	Development which is not	
Overcrowded schools	( 4 )	occurring	( 4 )
Conservatism of long-time residents	( 7 )	Other	( 16 )
Prejudice and racial conflict	( 3 )	No response	( 52 )
Crime	( 3 )		

5. How much influence do you as an individual have over what happens in this area?

Very Much ( 9 ) Some ( 43 ) A Little ( 32 ) Very Little ( 17 ) None ( 9 )

6. Do you feel local government represents your interests?

Always ( 5 ) Often ( 32 ) Sometimes ( 42 ) Rarely ( 26 ) Never ( 5 )



7. There has been much development of the area in recent years. Has this affected you in any way?

No ( 46 )      Yes ( 53 )      No response ( 1 )

If so, how?

Increased traffic	( 10 )	Created jobs	( 10 )
Strained public services	( 8 )	Crowded or destroyed	( 9 )
Produced housing shortage	( 8 )	land	( 8 )
Crowded schools	( 3 )	Diminished water supplies	( 12 )
Increased crime and disorder	( 7 )	Other	( 1 )
Improved business	( 16 )	No response	( 1 )

In general, have effects of development been positive or negative?

Very Positive ( 8 )      Neutral ( 13 )      Very Negative ( 0 )  
Positive ( 20 )      Negative ( 22 )

8. Have you had much contact with new residents of the area?

No ( 53 )      Yes ( 57 )

9. Have you heard anything about new residents of the area?

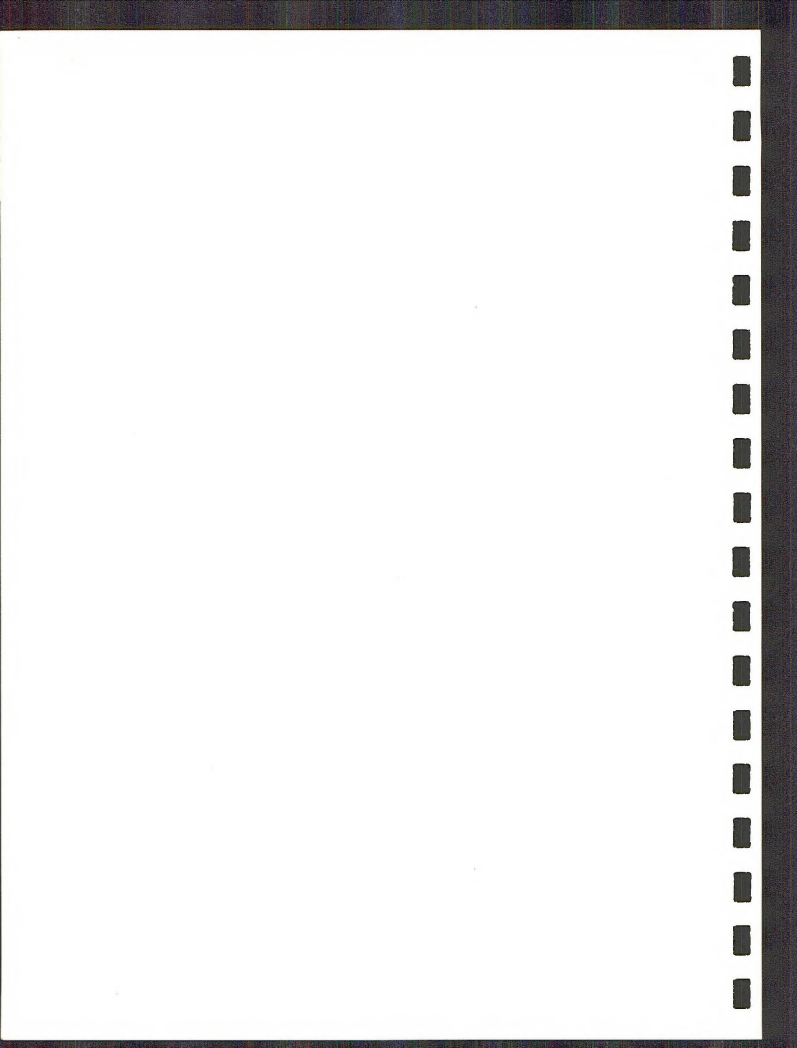
No ( 28 )      Yes ( 82 )

10. Are newcomers different from long-time residents?

No ( 20 )      Yes ( 58 )      No response ( 4 )

If so, how?

Transient	( 16 )	Deceitful	( 5 )
More sophisticated	( 4 )	Prejudiced	( 5 )
Better educated	( 4 )	Not Hispanic	( 2 )
Professional	( 6 )	Very strange	( 9 )
More liberal	( 6 )	Wasteful	( 3 )
More involved in	( 7 )	Other	( 9 )
community	( 8 )	No response	( 4 )
Rough, violent	( 16 )		
Disrespectful			



11. Do you think local people or outsiders will get most of the additional jobs from coal development in the area?

Local ( 4 ) Outsiders ( 60 ) Uncertain ( 6 )

Why?

Outsiders because of special skills	( 23 )
Low unemployment	( 9 )
Locals on welfare won't work	( 5 )
Mines too far to commute	( 3 )
Small population	( 9 )
Discrimination by companies and unions	( 9 )
Other	( 0 )

- 12 - 14. What positive and negative effects would further coal development have on you and your community?

End to small-town atmosphere	( 12 )	Add to pollution	( 5 )
Strain public services	( 28 )	Damage land and environment	( 28 )
Create housing shortage	( 20 )	Destroy traditional culture and values	( 19 )
Crowd schools	( 18 )	Overcrowd land	( 34 )
Increase traffic	( 13 )	Diminish water supplies	( 23 )
Add to alcoholism	( 5 )	Other	( 7 )
Add to racial conflict	( 12 )	No response	( 9 )
Strengthen liberal element	( 3 )	Add to business opportunities	( 29 )
Improve public services	( 4 )	Add to employment opportunities	( 60 )
Expand economic base	( 25 )	Other	( 4 )
		No response	( 21 )

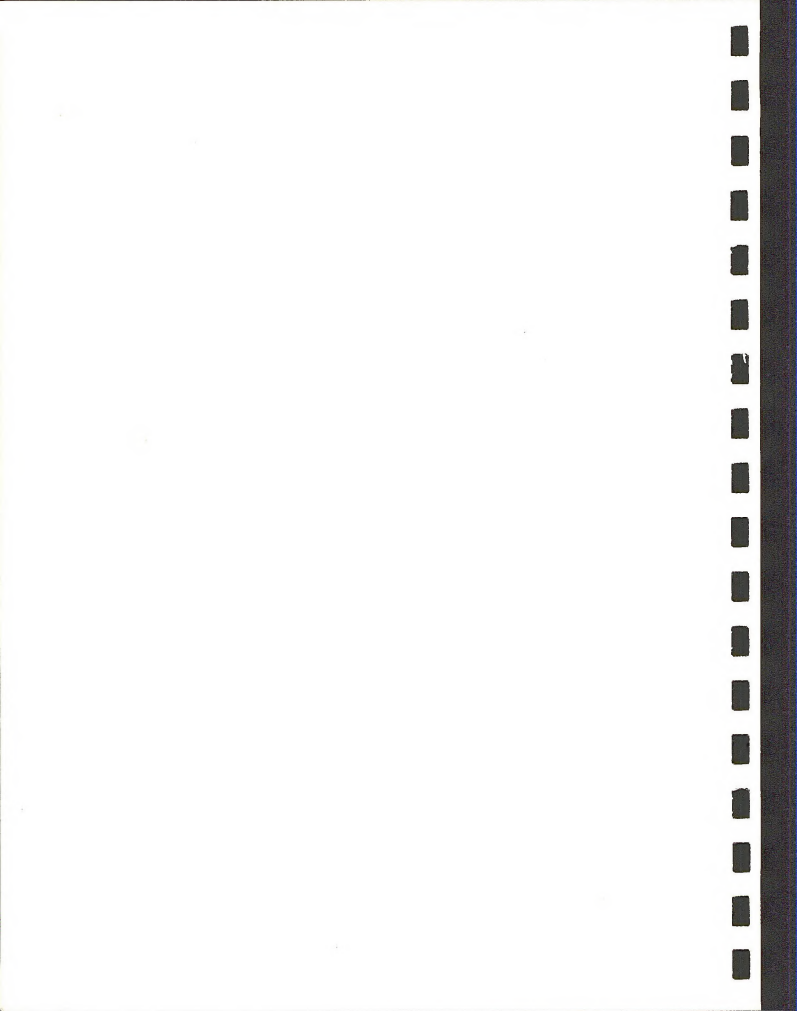
15. Ultimately, will development make the area a better or worse place to live?

Better ( 36 ) Same ( 42 ) Worse ( 26 ) No response ( 6 )

16. Overall, will development be positive, negative or neutral in its effects on you?

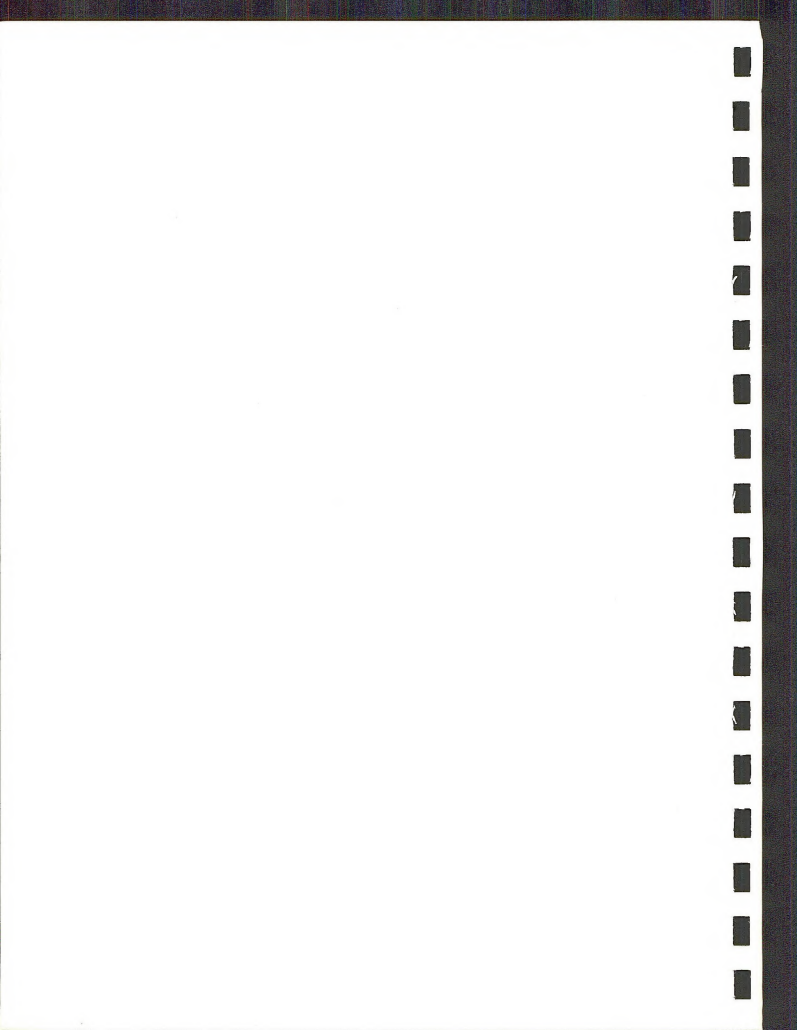
Positive ( 41 ) Neutral ( 44 ) Negative ( 22 ) No response ( 3 )





17 - 18. Anything to add?

Need to reclaim land	( 6 )	Need to reserve part of	
Need to enforce pollution		energy produced for	
controls & reclamation	(15 )	community	( 5 )
Include all parts of		Need to insure that Indians	
community in planning	(13 )	benefit	( 8 )
Need to enforce planning		Should relax environmental	
controls	( 3 )	regulations	( 2 )
Small businesses need help	( 2 )	Other	( 6 )
Need to resolve race			
relations	( 6 )		



RESPONSES: NORTHWESTERN NEW MEXICO COAL, JUNE-NOVEMBER, 1977

Characteristics of Respondents: Anglo

Number of Respondents: 43

Distribution of Respondents: All counties

1. How would you rate this area as a place in which to live?

Above Average ( 25 )	Below Average ( 5 )
Average ( 13 )	No response ( 0 )

2. How do you feel about the people who live around here?

Very Positive ( 13 )	Neutral ( 7 )	Very Negative ( 0 )
Positive ( 20 )	Negative ( 3 )	No Response ( 0 )

3. What do you like most about this area and this community?

The land ( 10 )	Climate ( 13 )
The people ( 15 )	Recreational activities ( 7 )
Small-town atmosphere ( 4 )	Other ( 2 )
Pace of life ( 5 )	No response ( 3 )
Business opportunities ( 8 )	Recreational opportunities ( 7 )
Employment opportunities ( 2 )	
Schools ( 3 )	

4. What do you like least about this area and this community?

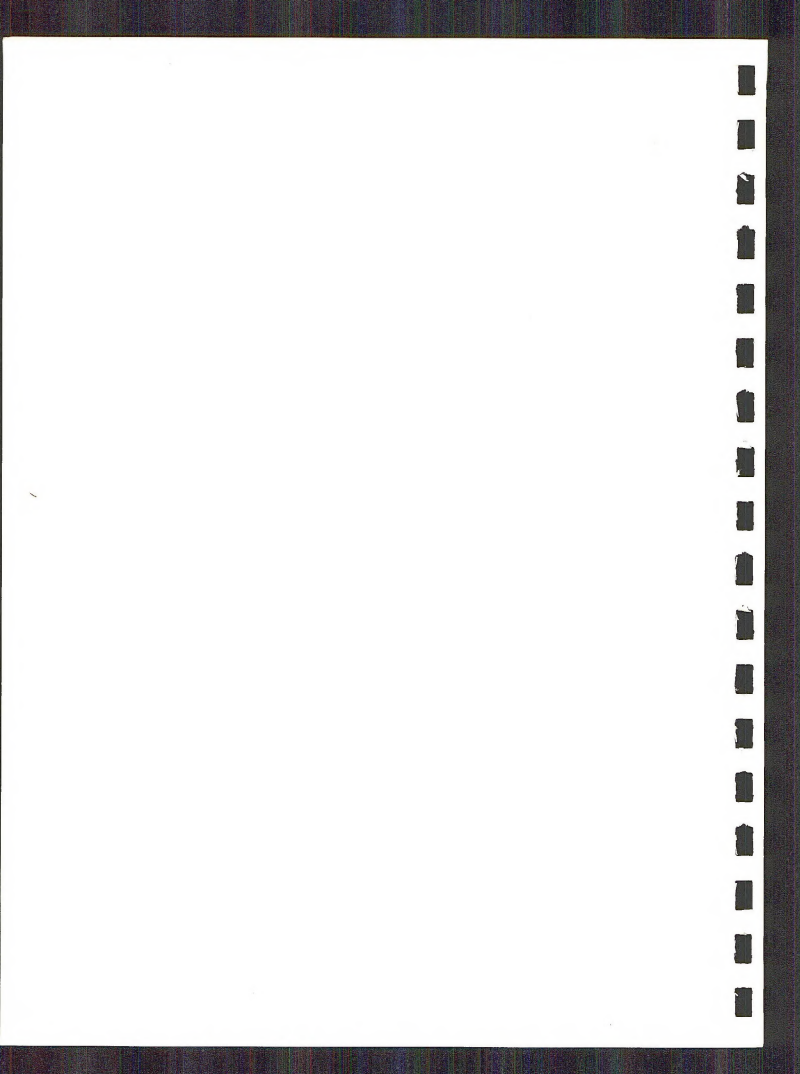
Isolation from major cities ( 8 )	Lack of concerted planning ( 5 )
Poor road conditions ( 4 )	Lack of land for development ( 2 )
Poor public services ( 3 )	Climate ( 1 )
Shortage of housing ( 4 )	Development which is not occurring ( 0 )
Overcrowded schools ( 2 )	Other ( 6 )
Conservatism of long-time residents ( 7 )	No response ( 5 )
Prejudice and racial conflict ( 1 )	Government regulation ( 3 )
Crime ( 1 )	Recreational areas ( 2 )
	No entertainment ( 2 )

5. How much influence do you as an individual have over what happens in this area?

Very Much ( 7 ) Some ( 18 ) A Little ( 9 ) Very Little ( 4 ) None ( 5 )

6. Do you feel local government represents your interests?

Always ( 5 ) Often ( 14 ) Sometimes ( 13 ) Rarely ( 7 ) Never ( 4 )



7. There has been much development of the area in recent years. Has this affected you in any way?

No ( 14 ) Yes ( 29 ) No response ( 0 )

If so, how?

Increased traffic	( 8 )	Created jobs	( 3 )
Strained public services	( 5 )	Crowded or destroyed	( 1 )
Produced housing shortage	( 7 )	land	( 3 )
Crowded schools	( 2 )	Diminished water supplies	( 10 )
Increased crime and disorder	( 2 )	Other	( 0 )
Improved business	( 10 )	No response	( 0 )

In general, have effects of development been positive or negative?

Very Positive ( 7 ) Neutral ( 4 ) Very Negative ( 0 )  
Positive ( 12 ) Negative ( 6 )

8. Have you had much contact with new residents of the area?

No ( 10 ) Yes ( 33 )

9. Have you heard anything about new residents of the area?

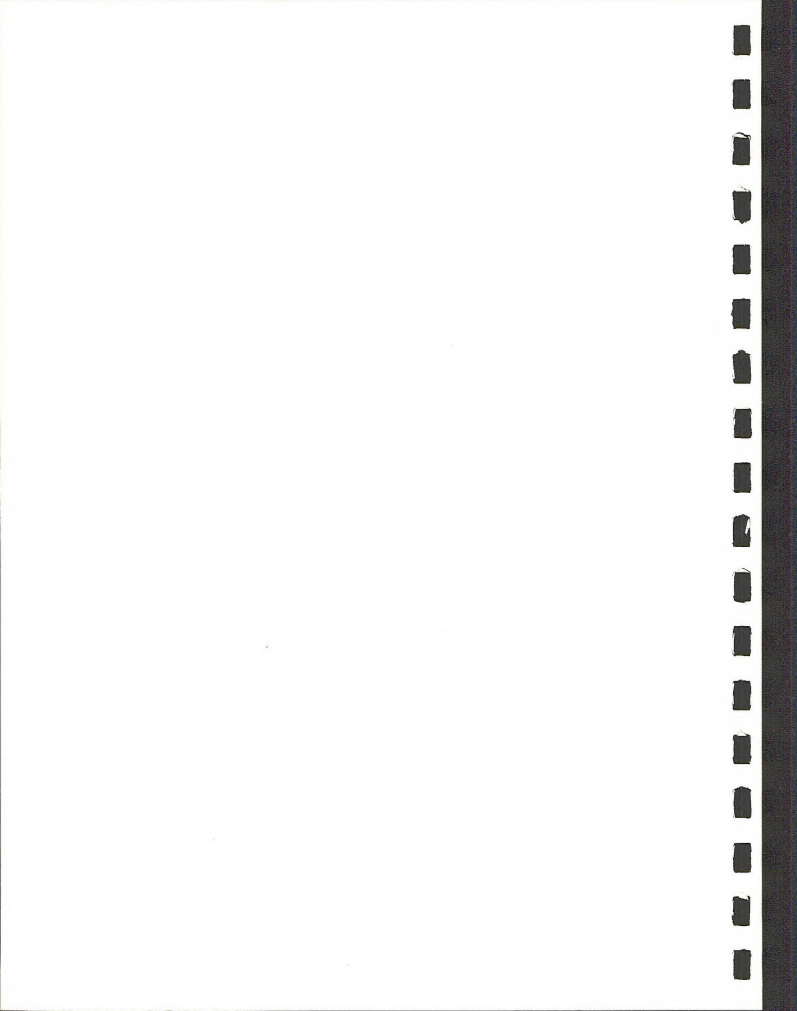
No ( 3 ) Yes ( 40 )

10. Are newcomers different from long-time residents?

No ( 13 ) Yes ( 27 ) No response ( 3 )

If so, how?

Transient	( 13 )	Deceitful	( 0 )
More sophisticated	( 2 )	Prejudiced	( 1 )
Better educated	( 2 )	Not Hispanic	( 2 )
Professional	( 3 )	Very strange	( 0 )
More liberal	( 4 )	Wasteful	( 0 )
More involved in	( 6 )	Other	( 3 )
community	( 2 )	No response	( 0 )
Rough, violent	( 0 )		
Disrespectful	( 0 )		



11. Do you think local people or outsiders will get most of the additional jobs from coal development in the area?

Local ( 13 ) Outsiders ( 27 ) Uncertain ( 3 )

Why?

Outsiders because of special skills	( 10 )
Low unemployment	( 9 )
Locals on welfare won't work	( 5 )
Mines too far to commute	( 1 )
Small population	( 5 )
Discrimination by companies and unions	( 0 )
Other	( 1 )

- 12 - 14. What positive and negative effects would further coal development have on you and your community?

End to small-town atmosphere	( 6 )	Add to pollution	( 5 )
Strain public services	( 23 )	Damage land and environment	( 7 )
Create housing shortage	( 12 )	Destroy traditional culture and values	( 1 )
Crowd schools	( 7 )	Overcrowd land	( 7 )
Increase traffic	( 8 )	Diminish water supplies	( 10 )
Add to alcoholism	( 1 )	Other	( 5 )
Add to racial conflict	( 1 )	No response	( 5 )
		Increase crime	( 10 )
Strengthen liberal element	( 3 )	Add to business opportunities	( 16 )
Improve public services	( 1 )	Add to employment opportunities	( 18 )
Expand economic base	( 11 )	Other	( 2 )
		No response	( 5 )

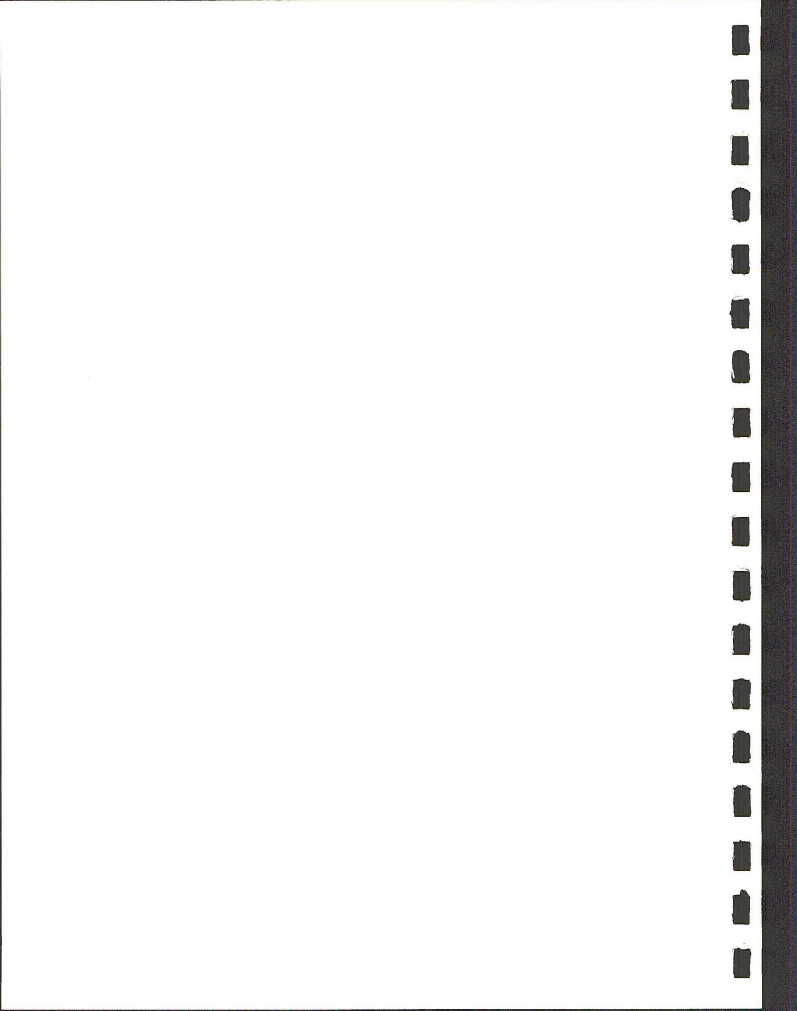
15. Ultimately, will development make the area a better or worse place to live?

Better ( 21 ) Same ( 11 ) Worse ( 7 ) No response ( 4 )

16. Overall, will development be positive, negative or neutral in its effects on you?

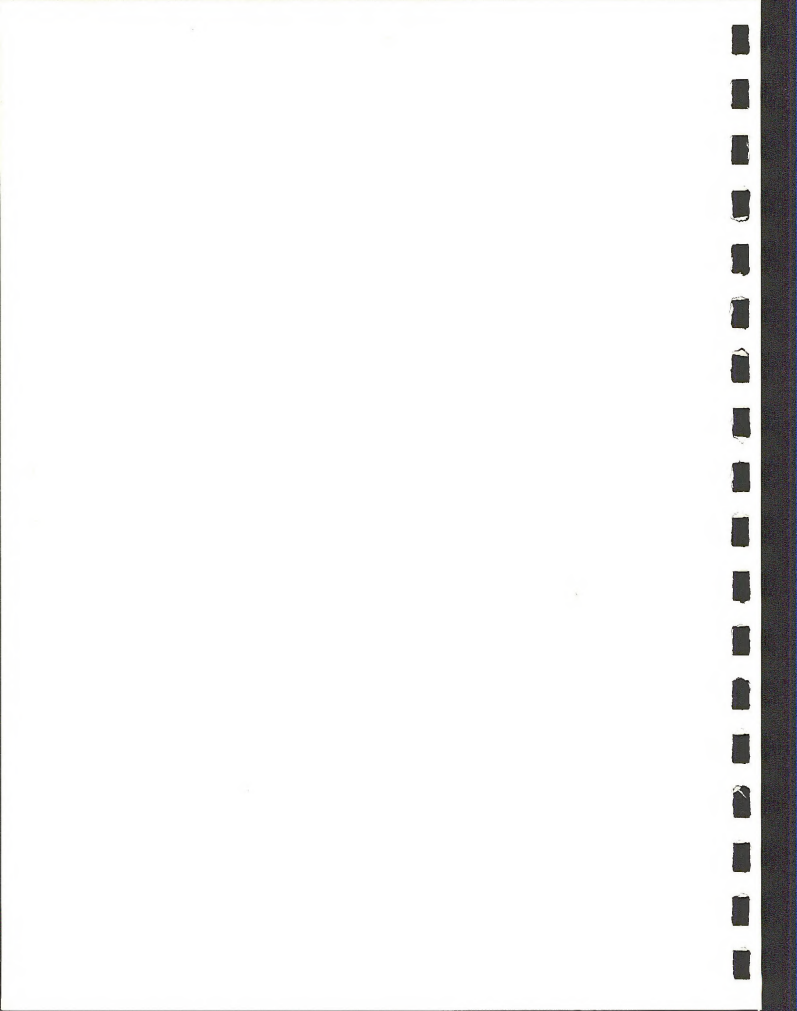
Positive ( 24 ) Neutral ( 11 ) Negative ( 5 ) No response ( 3 )





17 - 18. Anything to add?

Need to reclaim land	( 5 )	Need to reserve part of	
Need to enforce pollution		energy produced for	
controls & reclamation	( 10 )	community	( 1 )
Include all parts of		Need to insure that Indians	
community in planning	( 0 )	benefit	( 0 )
Need to enforce planning		Should relax environmental	
controls	( 0 )	regulations	( 2 )
Small businesses need help	( 2 )	Other	( 1 )
Need to resolve race			
relations	( 6 )		



RESPONSES: NORTHWESTERN NEW MEXICO COAL, JUNE-NOVEMBER, 1977

Characteristics of Respondents: Hispanic

Number of Respondents: 17

Distribution of Respondents: All counties

1. How would you rate this area as a place in which to live?

Above Average	{ 8 }	Below Average	{ 1 }
Average	{ 7 }	No response	{ 1 }

2. How do you feel about the people who live around here?

Very Positive	{ 6 }	Neutral	{ 2 }	Very Negative	{ 0 }
Positive	{ 8 }	Negative	{ 0 }	No Response	{ 1 }

3. What do you like most about this area and this community?

The land	{ 3 }	Climate	{ 3 }
The people	{ 5 }	Recreational activities	{ 2 }
Small-town atmosphere	{ 2 }	Other	{ 0 }
Pace of life	{ 4 }	No response	{ 3 }
Business opportunities	{ 0 }	Recreational oppor-	
Employment opportunities	{ 4 }	tunities	{ 2 }
Schools	{ 1 }		

4. What do you like least about this area and this community?

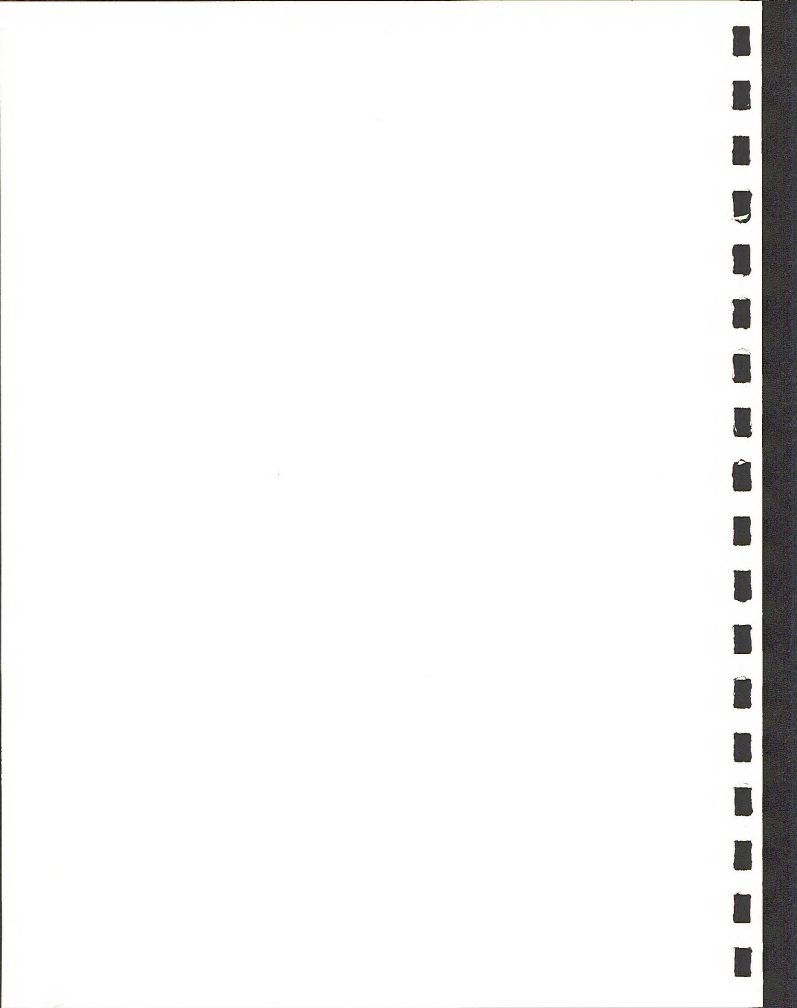
Isolation from major cities	{ 2 }	Lack of concerted planning	{ 0 }
Poor road conditions	{ 2 }	Lack of land for development	{ 0 }
Poor public services	{ 2 }	Climate	{ 1 }
Shortage of housing	{ 0 }	Development which is not	
Overcrowded schools	{ 0 }	occurring	{ 0 }
Conservatism of long-time residents	{ 0 }	Other	{ 1 }
Prejudice and racial conflict	{ 1 }	No response	{ 4 }
Crime	{ 1 }	Water	{ 2 }
		No entertainment	{ 2 }

5. How much influence do you as an individual have over what happens in this area?

Very Much ( 1 ) Some ( 8 ) A Little ( 6 ) Very Little ( 1 ) None ( 1 )

6. Do you feel local government represents your interests?

Always ( 0 ) Often ( 9 ) Sometimes ( 5 ) Rarely ( 2 ) Never ( 0 )  
No response ( 1 )



7. There has been much development of the area in recent years. Has this affected you in any way?

No ( 6 )      Yes ( 11 )      No response ( 0 )

If so, how?

Increased traffic	( 1 )	Created jobs	( 4 )
Strained public services	( 0 )	Crowded or destroyed	
Produced housing shortage	( 1 )	land	( 0 )
Crowded schools	( 1 )	Diminished water supplies	( 0 )
Increased crime and disorder	( 1 )	Other	( 2 )
Improved business	( 5 )	No response	( 1 )

In general, have effects of development been positive or negative?

Very Positive	( 1 )	Neutral	( 3 )	Very Negative	( 0 )
Positive	( 5 )	Negative	( 2 )		

8. Have you had much contact with new residents of the area?

No ( 5 )      Yes ( 12 )

9. Have you heard anything about new residents of the area?

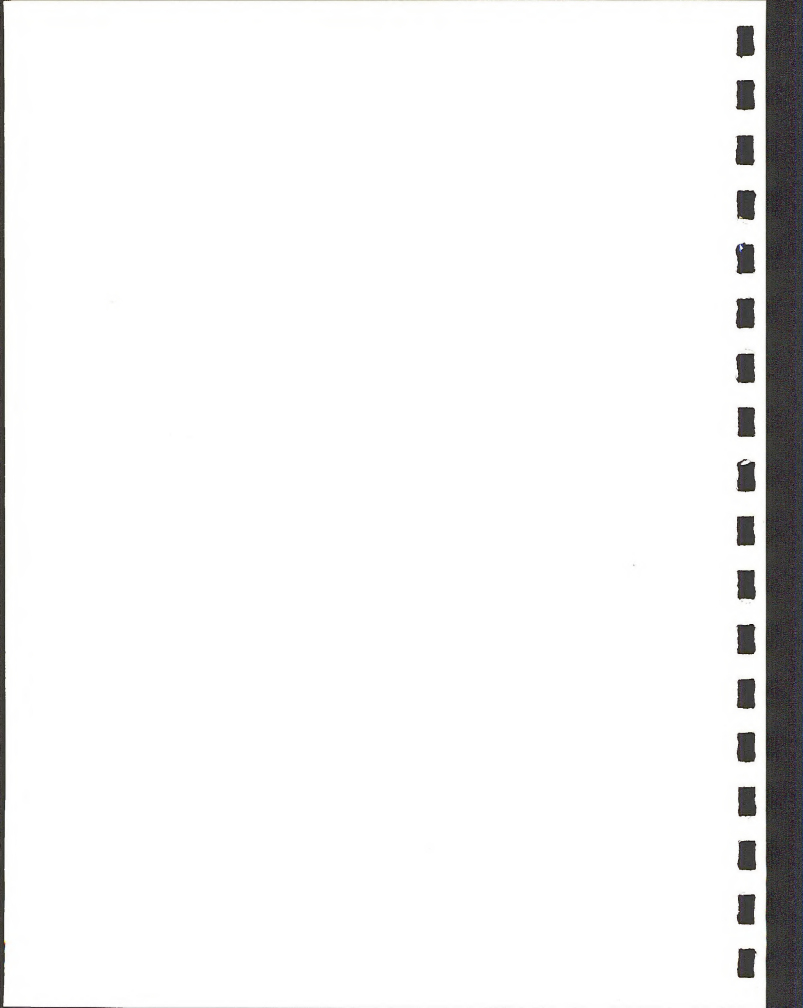
No ( 5 )      Yes ( 12 )

10. Are newcomers different from long-time residents?

No ( 5 )      Yes ( 7 )      No response ( 0 )

If so, how?

Transient	( 0 )	Deceitful	( 1 )
More sophisticated	( 2 )	Prejudiced	( 0 )
Better educated	( 0 )	Not Hispanic	( 0 )
Professional	( 1 )	Very strange	( 0 )
More liberal	( 2 )	Wasteful	( 0 )
More involved in		Other	( 2 )
community	( 1 )	No response	( 3 )
Rough, violent	( )		
Disrespectful	( )		



11. Do you think local people or outsiders will get most of the additional jobs from coal development in the area?

Local ( 8 ) Outsiders ( 6 ) Uncertain ( 3 )

Why?

Outsiders because of special skills	( 1 )
Low unemployment	( 1 )
Locals on welfare won't work	( 0 )
Mines too far to commute	( 0 )
Small population	( 3 )
Discrimination by companies	( 1 )
and unions	( 0 )
Other	( 0 )

- 12 - 14. What positive and negative effects would further coal development have on you and your community?

End to small-town atmosphere	( 0 )	Add to pollution	( 0 )
Strain public services	( 4 )	Damage land and environment	( 3 )
Create housing shortage	( 7 )	Destroy traditional culture and values	( 1 )
Crowd schools	( 1 )	Overcrowd land	( 1 )
Increase traffic	( 3 )	Diminish water supplies	( 0 )
Add to alcoholism	( 2 )	Other	( 1 )
Add to racial conflict	( 0 )	No response	( 1 )
		Increase crime	( 4 )
Strengthen liberal element	( 0 )	Add to business opportunities	( 9 )
Improve public services	( 0 )	Add to employment opportunities	( 8 )
Expand economic base	( 4 )	Other	( 0 )
		No response	( 1 )

15. Ultimately, will development make the area a better or worse place to live?

Better ( 8 ) Same ( 6 ) Worse ( 1 ) No response ( 2 )

16. Overall, will development be positive, negative or neutral in its effects on you?

Positive ( 10 ) Neutral ( 5 ) Negative ( 2 ) No response ( 0 )





17 - 18. Anything to add?

Need to reclaim land	( 1 )	Need to reserve part of	
Need to enforce pollution		energy produced for	
controls & reclamation	( 2 )	community	( 0 )
Include all parts of		Need to insure that Indians	
community in planning	( 0 )	benefit	( 0 )
Need to enforce planning		Should relax environmental	
controls	( 0 )	regulations	( 0 )
Small businesses need help	( 0 )	Other	( 0 )
Need to resolve race			
relations	( 0 )		



RESPONSES: NORTHWESTERN NEW MEXICO COAL, JUNE-NOVEMBER, 1977

Characteristics of Respondents: Indian

Number of Respondents: 49

Distribution of Respondents: All counties

1. How would you rate this area as a place in which to live?

Above Average ( 33 )	Below Average ( 1 )
Average ( 14 )	No response ( 1 )

2. How do you feel about the people who live around here?

Very Positive ( 28 )	Neutral ( 8 )	Very Negative ( 0 )
Positive ( 17 )	Negative ( 0 )	No Response ( 1 )

3. What do you like most about this area and this community?

The land ( 42 )	Climate ( 0 )
The people ( 42 )	Recreational activities ( 0 )
Small-town atmosphere ( 1 )	Other ( 0 )
Pace of life ( 1 )	No response ( 3 )
Business opportunities ( 1 )	
Employment opportunities ( 3 )	
Schools ( 5 )	

4. What do you like least about this area and this community?

Isolation from major cities ( 2 )	Lack of concerted planning ( 0 )
Poor road conditions ( 0 )	Lack of land for development ( 0 )
Poor public services ( 0 )	Climate ( 2 )
Shortage of housing ( 0 )	Development which is not occurring ( 3 )
Overcrowded schools ( 1 )	Other ( 2 )
Conservatism of long-time residents ( 0 )	No response ( 43 )
Prejudice and racial conflict ( 1 )	
Crime ( 1 )	

5. How much influence do you as an individual have over what happens in this area?

Very Much ( 1 ) Some ( 16 ) A Little ( 17 ) Very Little ( 12 ) None ( 3 )

6. Do you feel local government represents your interests?

Always ( 0 ) Often ( 8 ) Sometimes ( 23 ) Rarely ( 17 ) Never ( 1 )



7. There has been much development of the area in recent years. Has this affected you in any way?

No ( 25 ) Yes ( 24 ) No response ( 0 )

If so, how?

Increased traffic	( 0 )	Created jobs	( 3 )
Strained public services	( 0 )	Crowded or destroyed	
Produced housing shortage	( 1 )	land	( 0 )
Crowded schools	( 0 )	Diminished water supplies	( 5 )
Increased crime and disorder	( 2 )	Other	( 0 )
Improved business	( 2 )	No response	( 0 )
Increased apprehension	( 4 )	Made land more valuable	( 8 )

In general, have effects of development been positive or negative?

Very Positive	( 0 )	Neutral	( 8 )	Very Negative	( 0 )
Positive	( 2 )	Negative	( 13 )	No response	( 1 )

8. Have you had much contact with new residents of the area?

No ( 36 ) Yes ( 13 )

9. Have you heard anything about new residents of the area?

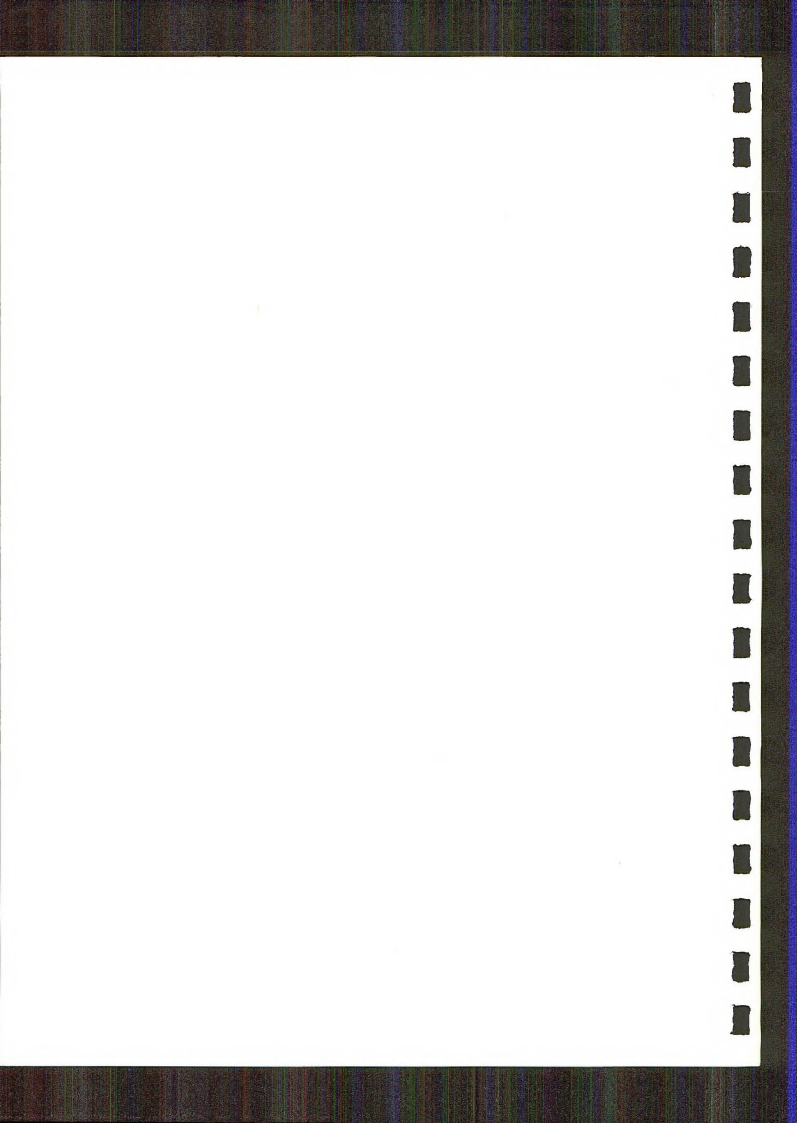
No ( 20 ) Yes ( 29 )

10. Are newcomers different from long-time residents?

No ( 2 ) Yes ( 24 ) No response ( 3 )

If so, how?

Transient	( 2 )	Deceitful	( 4 )
More sophisticated	( 0 )	Prejudiced	( 3 )
Better educated	( 0 )	Not Hispanic	( 0 )
Professional	( 1 )	Very strange	( 9 )
More liberal	( 0 )	Wasteful	( 3 )
More involved in		Other	( 0 )
community	( 0 )	No response	( 3 )
Rough, violent	( 6 )		
Disrespectful	( 15 )		



11. Do you think local people or outsiders will get most of the additional jobs from coal development in the area?

Local ( 21 ) Outsiders ( 27 ) Uncertain ( 1 )

Why?

Outsiders because of special skills	( 9 )
Low unemployment	( 0 )
Locals on welfare won't work	( 0 )
Mines too far to commute	( 2 )
Small population	( 1 )
Discrimination by companies and unions	( 17 )
Other	( 0 )

- 12 - 14. What positive and negative effects would further coal development have on you and your community?

End to small-town atmosphere	( 6 )	Add to pollution	( 0 )
Strain public services	( 1 )	Damage land and environment	( 18 )
Create housing shortage	( 1 )	Destroy traditional culture and values	( 17 )
Crowd schools	( 0 )	Overcrowd land	( 26 )
Increase traffic	( 2 )	Diminish water supplies	( 13 )
Add to alcoholism	( 2 )	Other	( 2 )
Add to racial conflict	( 12 )	No response	( 3 )
Strengthen liberal element	( 0 )	Add to business opportunities	( 4 )
Improve public services	( 3 )	Add to employment opportunities	( 34 )
Expand economic base	( 10 )	Other	( 0 )
		No response	( 15 )

15. Ultimately, will development make the area a better or worse place to live?

Better ( 7 ) Same ( 24 ) Worse ( 18 ) No response ( 0 )

16. Overall, will development be positive, negative or neutral in its effects on you?

Positive ( 7 ) Neutral ( 27 ) Negative ( 15 ) No response ( 0 )





17 - 18. Anything to add?

Need to reclaim land	( 1 )	Need to reserve part of	
Need to enforce pollution		energy produced for	
controls & reclamation	( 7 )	community	( 4 )
Include all parts of		Need to insure that Indians	
community in planning	(12 )	benefit	( 8 )
Need to enforce planning		Should relax environmental	
controls	( 0 )	regulations	( 0 )
Small businesses need help	( 0 )	Other	( 0 )
Need to resolve race			
relations	( 0 )		



RESPONSES: NORTHWESTERN NEW MEXICO COAL, JUNE-NOVEMBER, 1977

Characteristics of Respondents: All

Number of Respondents: 50

Distribution of Respondents: McKinley County

1. How would you rate this area as a place in which to live?

Above Average ( 27 )	Below Average ( 5 )
Average ( 16 )	No response ( 2 )

2. How do you feel about the people who live around here?

Very Positive ( 22 )	Neutral ( 2 )	Very Negative ( 0 )
Positive ( 25 )	Negative ( 0 )	No Response ( 1 )

3. What do you like most about this area and this community?

The land ( 27 )	Climate ( 6 )
The people ( 37 )	Recreational activities ( 1 )
Small-town atmosphere ( 1 )	Other ( 0 )
Pace of life ( 4 )	No response ( 3 )
Business opportunities ( 4 )	
Employment opportunities ( 4 )	
Schools ( 5 )	

4. What do you like least about this area and this community?

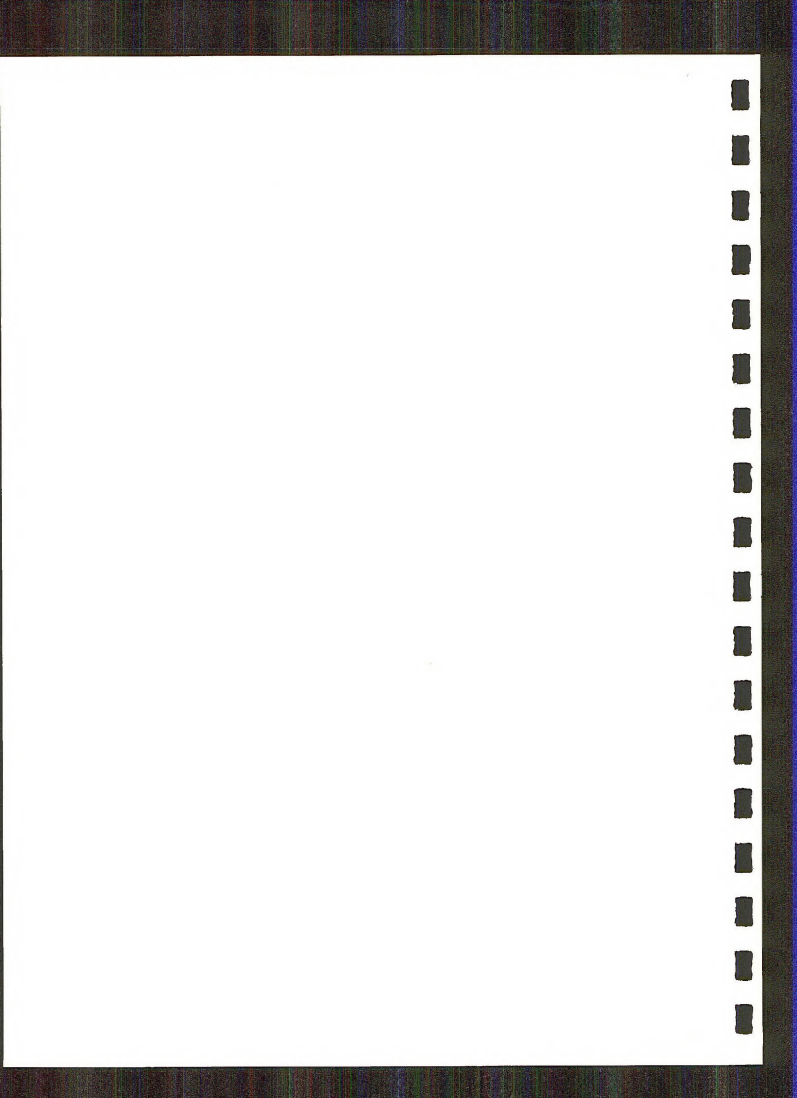
Isolation from major cities ( 4 )	Lack of concerted planning ( 0 )
Poor road conditions ( 3 )	Lack of land for development ( 0 )
Poor public services ( 3 )	Climate ( 1 )
Shortage of housing ( 2 )	Development which is not occurring ( 0 )
Overcrowded schools ( 3 )	Other ( 1 )
Conservatism of long-time residents ( 0 )	No response ( 32 )
Prejudice and racial conflict ( 1 )	Alcoholism ( 2 )
Crime ( 0 )	Lack of recreational areas ( 2 )

5. How much influence do you as an individual have over what happens in this area?

Very Much ( 2 ) Some ( 16 ) A Little ( 21 ) Very Little ( 6 ) None ( 5 )

6. Do you feel local government represents your interests?

Always ( 1 ) Often ( 10 ) Sometimes ( 24 ) Rarely ( 11 ) Never ( 3 )  
No response ( 1 )



7. There has been much development of the area in recent years. Has this affected you in any way?

No ( 30 )    Yes ( 20 )    No response ( 0 )

If so, how?

Increased traffic	( 2 )	Created jobs	( 2 )
Strained public services	( 2 )	Crowded or destroyed	( 0 )
Produced housing shortage	( 4 )	land	( 1 )
Crowded schools	( 1 )	Diminished water supplies	( 0 )
Increased crime and disorder	( 4 )	Other	( 0 )
Improved business	( 3 )	No response	( 0 )
Land more valuable	( 4 )		

In general, have effects of development been positive or negative?

Very Positive ( 2 )	Neutral ( 5 )	Very Negative ( 0 )
Positive ( 4 )	Negative ( 6 )	No response ( 3 )

8. Have you had much contact with new residents of the area?

No ( 31 )    Yes ( 19 )

9. Have you heard anything about new residents of the area?

No ( 19 )    Yes ( 31 )

10. Are newcomers different from long-time residents?

No ( 7 )    Yes ( 24 )    No response ( )

If so, how?

Transient	( 5 )	Deceitful	( 1 )
More sophisticated	( 0 )	Prejudiced	( 3 )
Better educated	( 1 )	Not Hispanic	( 1 )
Professional	( 2 )	Very strange	( 2 )
More liberal	( 0 )	Wasteful	( 1 )
More involved in community	( 2 )	Other	( 0 )
Rough, violent	( 3 )	No response	( 2 )
Disrespectful	( 8 )		



11. Do you think local people or outsiders will get most of the additional jobs from coal development in the area?

Local ( 24 ) Outsiders ( 23 ) Uncertain ( 3 )

Why?

Outsiders because of special skills	( 5 )
Low unemployment	( 1 )
Locals on welfare won't work	( 0 )
Mines too far to commute	( 1 )
Small population	( 4 )
Discrimination by companies and unions	( 7 )
Other	( 0 )
No response	( 4 )

- 12 - 14. What positive and negative effects would further coal development have on you and your community?

End to small-town atmosphere	( 8 )	Add to pollution	( 0 )
Strain public services	( 6 )	Damage land and environment	( 1 )
Create housing shortage	( 4 )	Destroy traditional culture and values	( 8 )
Crowd schools	( 0 )	Overcrowd land	( 21 )
Increase traffic	( 3 )	Diminish water supplies	( 10 )
Add to alcoholism	( 1 )	Other	( 0 )
Add to racial conflict	( 7 )	No response	( 5 )
Increase Crime	( 4 )	Crowd Health care facilities	( 2 )
Strengthen liberal element	( 0 )	Add to business opportunities	( 12 )
Improve public services	( 3 )	Add to employment opportunities	( 28 )
Expand economic base	( 5 )	Other	( 0 )
		No response	( 13 )

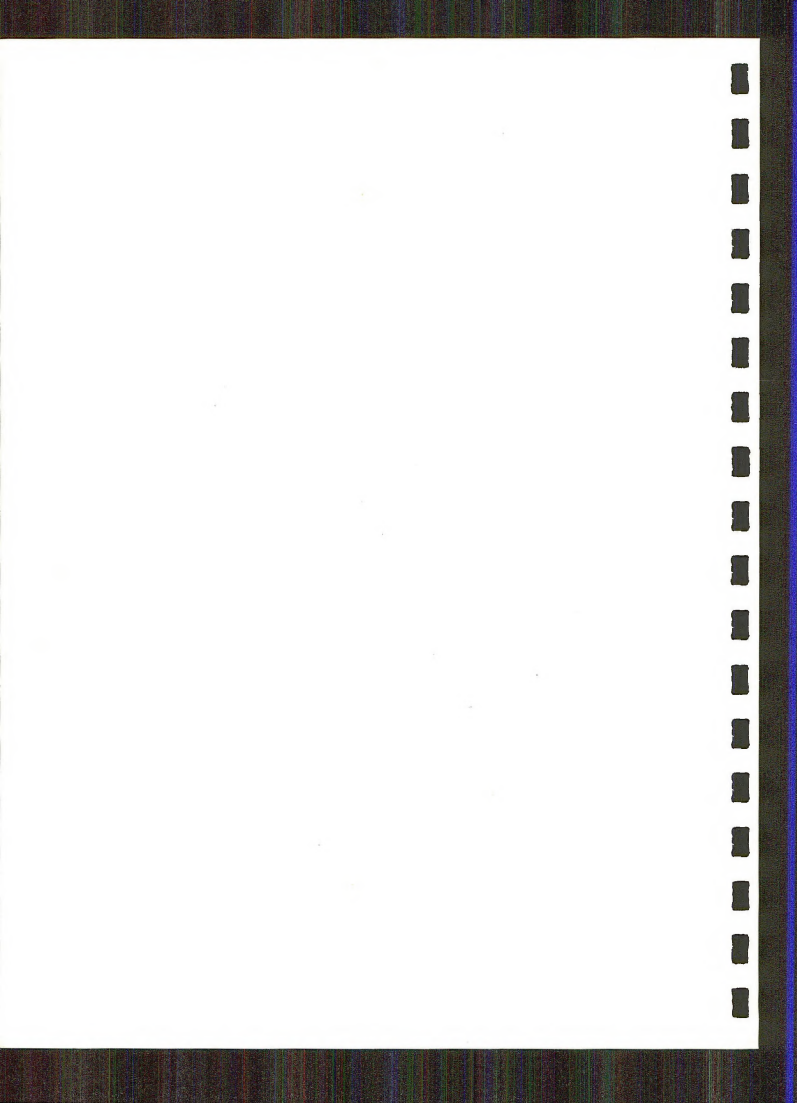
15. Ultimately, will development make the area a better or worse place to live?

Better ( 15 ) Same ( 18 ) Worse ( 16 ) No response ( 1 )

16. Overall, will development be positive, negative or neutral in its effects on you?

Positive ( 16 ) Neutral ( 25 ) Negative ( 9 ) No response ( 0 )





17 - 18. Anything to add?

Need to reclaim land	( 1 )	Need to reserve part of	
Need to enforce pollution		energy produced for	
controls & reclamation	( 4 )	community	( 4 )
Include all parts of		Need to insure that Indians	
community in planning	( 11 )	benefit	( 7 )
Need to enforce planning		Should relax environmental	
controls	( 0 )	regulations	( 0 )
Small businesses need help	( 0 )	Other	( 2 )
Need to resolve race			
relations	( 0 )		



RESPONSES: NORTHWESTERN NEW MEXICO COAL, JUNE-NOVEMBER, 1977

Characteristics of Respondents: All

Number of Respondents: 7

Distribution of Respondents: Sandoval County

1. How would you rate this area as a place in which to live?

Above Average { 6 }	Below Average { 0 }
Average { 1 }	No response { 0 }

2. How do you feel about the people who live around here?

Very Positive { 3 }	Neutral { 1 }	Very Negative { 0 }
Positive { 3 }	Negative { 0 }	No Response { 0 }

3. What do you like most about this area and this community?

The land { 1 }	Climate { 0 }
The people { 3 }	Recreational activities { 0 }
Small-town atmosphere { 0 }	Other { 0 }
Pace of life { 4 }	No response { 1 }
Business opportunities { 0 }	
Employment opportunities { 0 }	
Schools { 0 }	

4. What do you like least about this area and this community?

Isolation from major cities { 0 }	Lack of concerted planning { 0 }
Poor road conditions { 0 }	Lack of land for development { 0 }
Poor public services { 0 }	Climate { 0 }
Shortage of housing { 0 }	Development which is not occurring { 0 }
Overcrowded schools { 0 }	Other { 1 }
Conservatism of long-time residents { 0 }	No response { 5 }
Prejudice and racial conflict { 0 }	Water { 2 }
Crime { 0 }	

5. How much influence do you as an individual have over what happens in this area?

Very Much { 1 } Some { 6 } A Little { 0 } Very Little { 0 } None { 0 }

6. Do you feel local government represents your interests?

Always { 0 } Often { 6 } Sometimes { 0 } Rarely { 1 } Never { 0 }



7. There has been much development of the area in recent years. Has this affected you in any way?

No ( 5 )    Yes ( 2 )    No response ( 0 )

If so, how?

Increased traffic	( 0 )	Created jobs	( 2 )
Strained public services	( 0 )	Crowded or destroyed	( 0 )
Produced housing shortage	( 0 )	land	( 0 )
Crowded schools	( 0 )	Diminished water supplies	( 0 )
Increased crime and disorder	( 0 )	Other	( 0 )
Improved business	( 1 )	No response	( 0 )

In general, have effects of development been positive or negative?

Very Positive ( 0 )    Neutral ( 0 )    Very Negative ( 0 )  
Positive ( 2 )    Negative ( 0 )

8. Have you had much contact with new residents of the area?

No ( 5 )    Yes ( 2 )

9. Have you heard anything about new residents of the area?

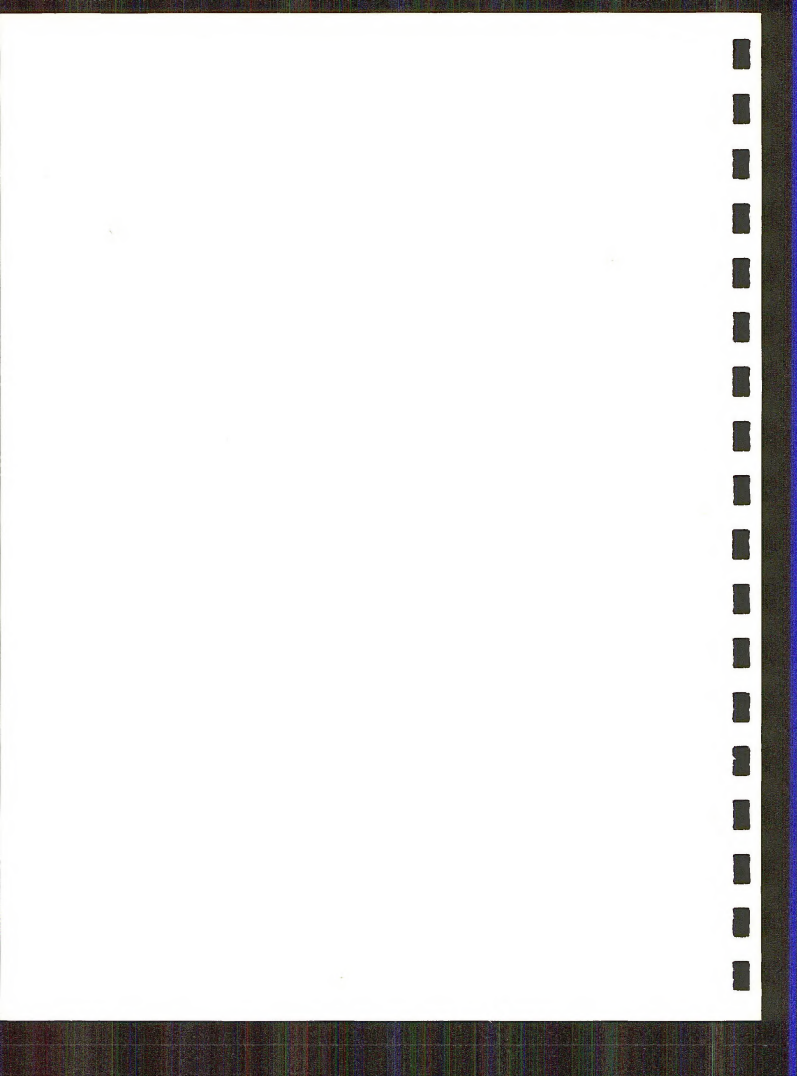
No ( 4 )    Yes ( 3 )

10. Are newcomers different from long-time residents?

No ( 0 )    Yes ( 3 )    No response ( 4 )

If so, how?

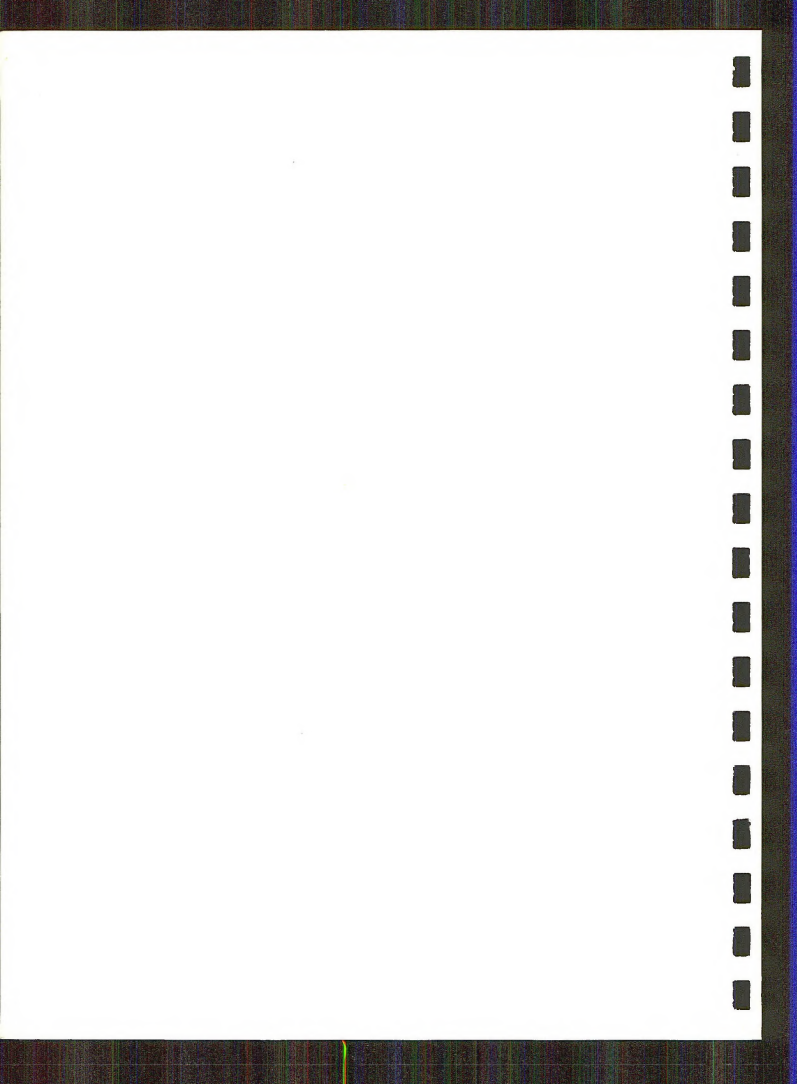
Transient	( 1 )	Deceitful	( 0 )
More sophisticated	( 0 )	Prejudiced	( 0 )
Better educated	( 0 )	Not Hispanic	( 0 )
Professional	( 1 )	Very strange	( 0 )
More liberal	( 0 )	Wasteful	( 0 )
More involved in	( 0 )	Other	( 0 )
community	( 1 )	No response	( 0 )
Rough, violent	( 0 )		
Disrespectful	( 0 )		



17 - 18. Anything to add?

Need to reclaim land	( 0 )	Need to reserve part of	
Need to enforce pollution		energy produced for	
controls & reclamation	( 2 )	community	( 0 )
Include all parts of		Need to insure that Indians	
community in planning	( 0 )	benefit	( 0 )
Need to enforce planning		Should relax environmental	
controls	( 0 )	regulations	( 0 )
Small businesses need help	( 0 )	Other	( 0 )
Need to resolve race			
relations	( 0 )		





RESPONSES: NORTHWESTERN NEW MEXICO COAL, JUNE-NOVEMBER, 1977

Characteristics of Respondents: All

Number of Respondents: 37

Distribution of Respondents: San Juan County

1. How would you rate this area as a place in which to live?

Above Average	( 25 )	Below Average	( 3 )
Average	( 9 )	No response	( 0 )

2. How do you feel about the people who live around here?

Very Positive	( 20 )	Neutral	( 3 )	Very Negative	( 0 )
Positive	( 11 )	Negative	( 3 )	No Response	( 0 )

3. What do you like most about this area and this community?

The land	( 20 )	Climate	( 6 )
The people	( 20 )	Recreational activities	( 5 )
Small-town atmosphere	( 4 )	Other	( 0 )
Pace of life	( 2 )	No response	( 3 )
Business opportunities	( 4 )		
Employment opportunities	( 4 )		
Schools	( 3 )		

4. What do you like least about this area and this community?

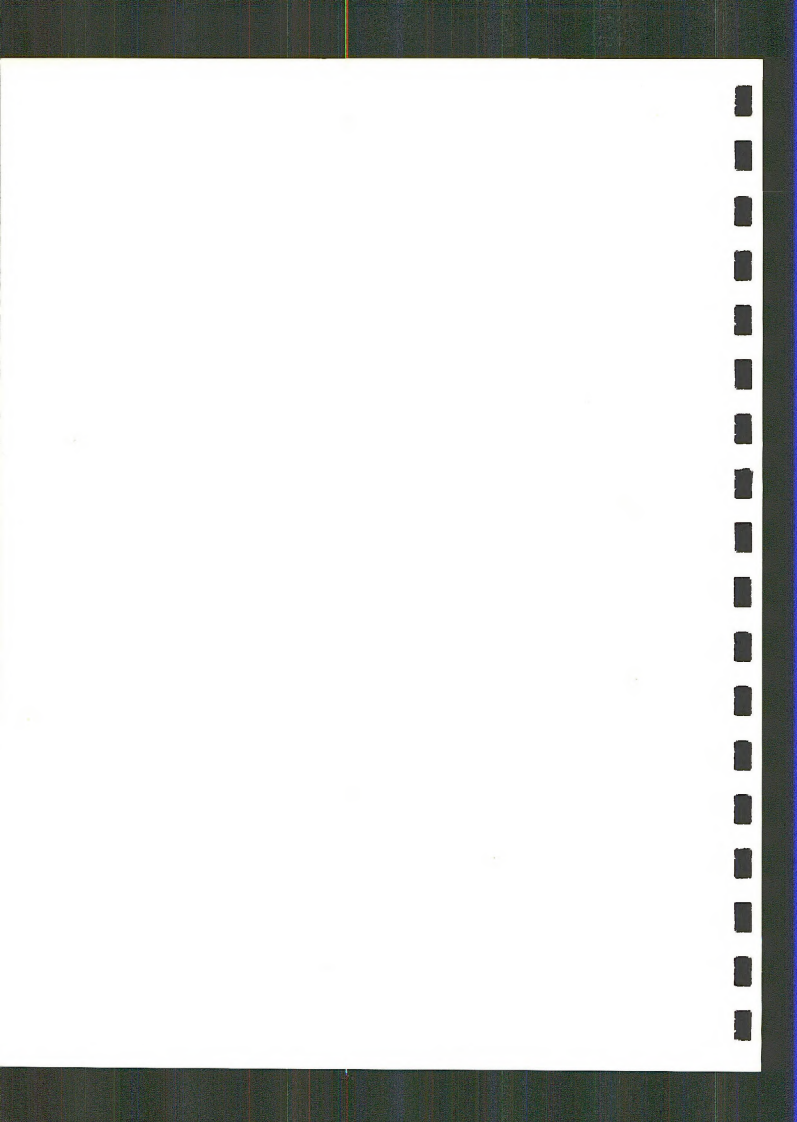
Isolation from major cities	( 6 )	Lack of concerted planning	( 5 )
Poor road conditions	( 2 )	Lack of land for development	( 2 )
Poor public services	( 1 )	Climate	( 1 )
Shortage of housing	( 2 )	Development which is not	
Overcrowded schools	( 0 )	occurring	( 4 )
Conservatism of long-time		Other	( 3 )
residents	( 5 )	No response	( 9 )
Prejudice and racial conflict	( 2 )	Government regulation	( 2 )
Crime	( 1 )		

5. How much influence do you as an individual have over what happens in this area?

Very Much ( 5 ) Some ( 14 ) A Little ( 8 ) Very Little ( 8 ) None ( 1 )

6. Do you feel local government represents your interests?

Always ( 3 ) Often ( 6 ) Sometimes ( 15 ) Rarely ( 10 ) Never ( 2 )  
No response ( 1 )



7. There has been much development of the area in recent years. Has this affected you in any way?

No ( 5 )      Yes ( 32 )      No response ( 0 )

If so, how?

Increased traffic	( 6 )	Created jobs	( 3 )
Strained public services	( 6 )	Crowded or destroyed	
Produced housing shortage	( 3 )	land	( 0 )
Crowded schools	( 1 )	Diminished water supplies	( 5 )
Increased crime and disorder	( 1 )	Other	( 9 )
Improved business	( 8 )	No response	( 0 )
		Land more valuable	( 4 )

In general, have effects of development been positive or negative?

Very Positive ( 4 )      Neutral ( 3 )      Very Negative ( 0 )  
Positive ( 13 )      Negative ( 12 )

8. Have you had much contact with new residents of the area?

No ( 11 )      Yes ( 26 )

9. Have you heard anything about new residents of the area?

No ( 4 )      Yes ( 33 )

10. Are newcomers different from long-time residents?

No ( 5 )      Yes ( 28 )      No response ( 0 )

If so, how?

Transient	( 6 )	Deceitful	( 2 )
More sophisticated	( 4 )	Prejudiced	( 1 )
Better educated	( 2 )	Not Hispanic	( 0 )
Professional	( 3 )	Very strange	( 8 )
More liberal	( 6 )	Wasteful	( 1 )
More involved in		Other	( 3 )
community	( 4 )	No response	( 4 )
Rough, violent	( 4 )		
Disrespectful	( 7 )		



11. Do you think local people or outsiders will get most of the additional jobs from coal development in the area?

Local ( 9 ) Outsiders ( 28 ) Uncertain ( 0 )

Why?

Outsiders because of special skills	( 16 )
Low unemployment	( 6 )
Locals on welfare won't work	( 0 )
Mines too far to commute	( 0 )
Small population	( 2 )
Discrimination by companies and unions	( 3 )
Other	( 1 )

- 12 - 14. What positive and negative effects would further coal development have on you and your community?

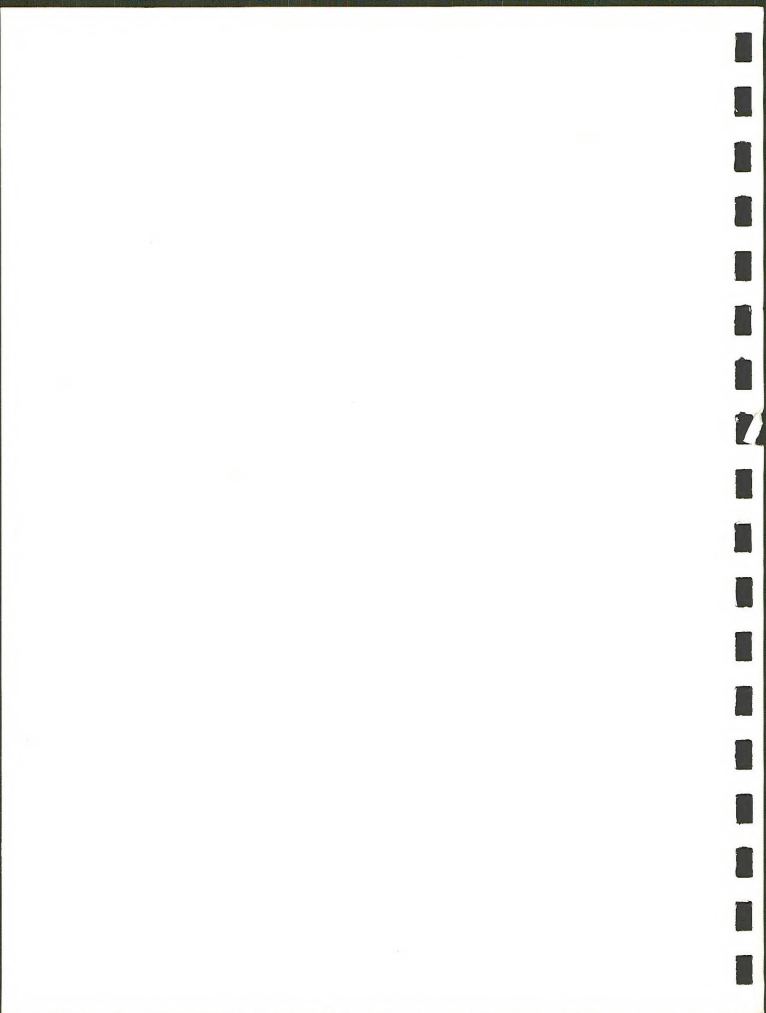
End to small-town atmosphere	( 5 )	Add to pollution	( 5 )
Strain public services	( 20 )	Damage land and environment	( 8 )
Create housing shortage	( 10 )	Destroy traditional culture and values	( 8 )
Crowd schools	( 7 )	Overcrowd land	( 10 )
Increase traffic	( 9 )	Diminish water supplies	( 11 )
Add to alcoholism	( 3 )	Other	( 1 )
Add to racial conflict	( 4 )	No response	( 2 )
Increase crime	( 10 )	Crowd recreational areas	( 2 )
Strengthen liberal element	( 3 )	Add to business opportunities	( 10 )
Improve public services	( 1 )	Add to employment opportunities	( 22 )
Expand economic base	( 18 )	Other	( 1 )
Strengthen community involvement	( 2 )	No response	( 1 )

15. Ultimately, will development make the area a better or worse place to live?

Better ( 15 ) Same ( 9 ) Worse ( 12 ) No response ( 1 )

16. Overall, will development be positive, negative or neutral in its effects on you?

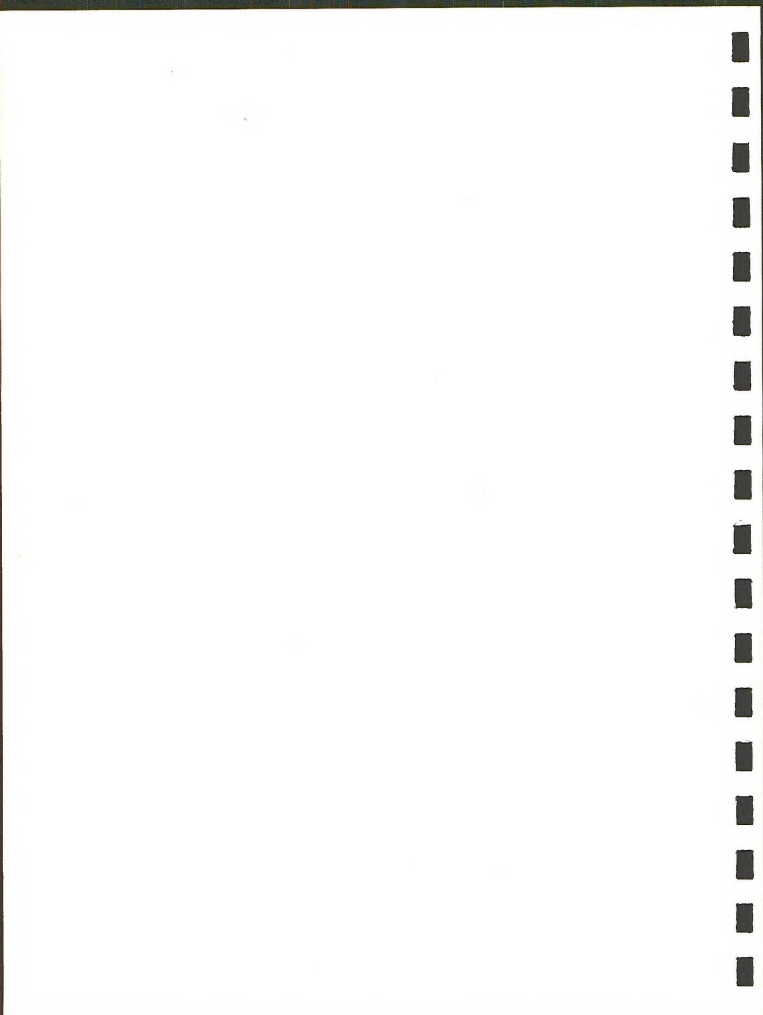
Positive ( 16 ) Neutral ( 8 ) Negative ( 12 ) No response ( 1 )



17 - 18. Anything to add?

Need to reclaim land	( 5 )	Need to reserve part of	
Need to enforce pollution		energy produced for	
controls & reclamation	( 9 )	community	( 1 )
Include all parts of		Need to insure that Indians	( 1 )
community in planning	( 1 )	benefit	( 1 )
Need to enforce planning		Should relax environmental	
controls	( 3 )	regulations	( 2 )
Small businesses need help	( 2 )	Other	( 1 )
Need to resolve race			
relations	( 6 )		





RESPONSES: NORTHWESTERN NEW MEXICO COAL, JUNE-NOVEMBER, 1977

Characteristics of Respondents: All

Number of Respondents: 15

Distribution of Respondents: Valencia County

1. How would you rate this area as a place in which to live?

Above Average ( 4 )	Below Average ( 0 )
Average ( 9 )	No response ( 1 )

2. How do you feel about the people who live around here?

Very Positive ( 3 )	Neutral ( 4 )	Very Negative ( 0 )
Positive ( 7 )	Negative ( 0 )	No Response ( 1 )

3. What do you like most about this area and this community?

The land ( 6 )	Climate ( 4 )
The people ( 6 )	Recreational activities ( 1 )
Small-town atmosphere ( 2 )	Other ( 1 )
Pace of life ( 1 )	No response ( 2 )
Business opportunities ( 0 )	
Employment opportunities ( 0 )	
Schools ( . 0 )	

4. What do you like least about this area and this community?

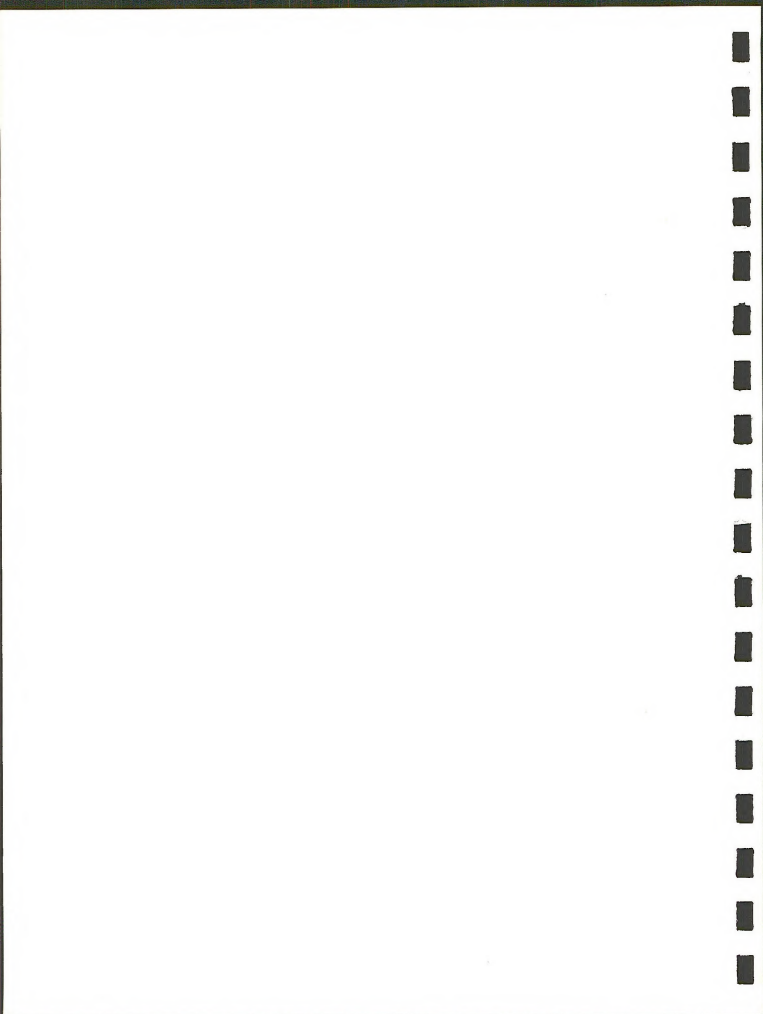
Isolation from major cities ( 4 )	Lack of concerted planning ( 0 )
Poor road conditions ( 1 )	Lack of land for development ( 0 )
Poor public services ( 0 )	Climate ( 2 )
Shortage of housing ( 0 )	Development which is not occurring ( 0 )
Overcrowded schools ( 0 )	Other ( 4 )
Conservatism of long-time residents ( 2 )	No response ( 1 )
Prejudice and racial conflict ( 0 )	
Crime ( 1 )	

5. How much influence do you as an individual have over what happens in this area?

Very Much ( 2 ) Some ( 7 ) A Little ( 2 ) Very Little ( 2 ) None ( 2 )

6. Do you feel local government represents your interests?

Always ( 1 ) Often ( 8 ) Sometimes ( 3 ) Rarely ( 3 ) Never ( 0 )



7. There has been much development of the area in recent years. Has this affected you in any way?

No ( 5 )    Yes ( 10 )    No response ( 0 )

If so, how?

Increased traffic	( 1 )	Created jobs	( 4 )
Strained public services	( 0 )	Crowded or destroyed	( 0 )
Produced housing shortage	( 1 )	land	( 2 )
Crowded schools	( 1 )	Diminished water supplies	( 2 )
Increased crime and disorder	( 0 )	Other	( 2 )
Improved business	( 3 )	No response	( 0 )

In general, have effects of development been positive or negative?

Very Positive ( 3 )    Neutral ( 5 )    Very Negative ( 0 )  
Positive ( 1 )    Negative ( 2 )

8. Have you had much contact with new residents of the area?

No ( 5 )    Yes ( 10 )

9. Have you heard anything about new residents of the area?

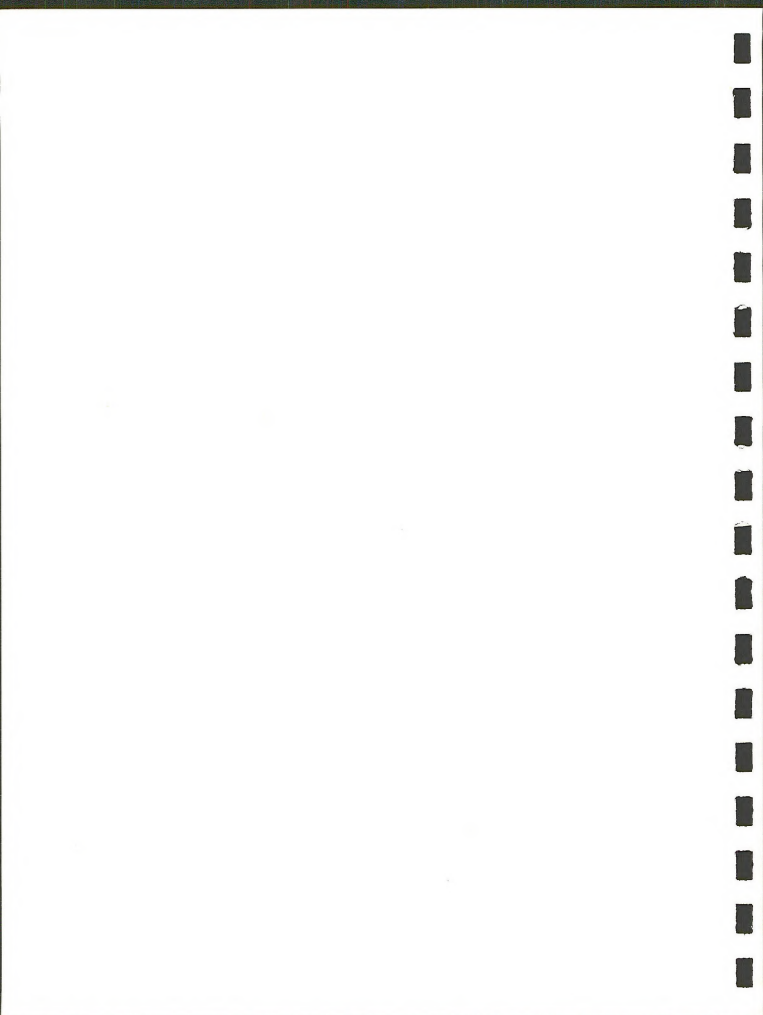
No ( 2 )    Yes ( 13 )

10. Are newcomers different from long-time residents?

No ( 4 )    Yes ( 9 )    No response ( 0 )

If so, how?

Transient	( 4 )	Deceitful	( 1 )
More sophisticated	( 1 )	Prejudiced	( 0 )
Better educated	( 0 )	Not Hispanic	( 1 )
Professional	( 0 )	Very strange	( 0 )
More liberal	( 0 )	Wasteful	( 0 )
More involved in community	( 0 )	Other	( 2 )
Rough, violent	( 1 )	No response	( 0 )
Disrespectful	( 0 )		



11. Do you think local people or outsiders will get most of the additional jobs from coal development in the area?

Local ( 7 ) Outsiders ( 6 ) Uncertain ( 2 )

Why?

Outsiders because of special skills	( 0 )
Low unemployment	( 2 )
Locals on welfare won't work	( 1 )
Mines too far to commute	( 2 )
Small population	( 0 )
Discrimination by companies and unions	( 1 )
Other	( 0 )

- 12 - 14. What positive and negative effects would further coal development have on you and your community?

End to small-town atmosphere	( 1 )	Add to pollution	( 0 )
Strain public services	( 5 )	Damage land and environment	( 3 )
Create housing shortage	( 3 )	Destroy traditional culture and values	( 1 )
Crowd schools	( 1 )	Overcrowd land	( 0 )
Increase traffic	( 0 )	Diminish water supplies	( 2 )
Add to alcoholism	( 0 )	Other	( 3 )
Add to racial conflict	( 1 )	No response	( 1 )

Strengthen liberal element	( 0 )	Add to business opportunities	( 4 )
Improve public services	( 0 )	Add to employment opportunities	( 9 )
Expand economic base	( 2 )	Other	( 1 )
		No response	( 2 )

15. Ultimately, will development make the area a better or worse place to live?

Better ( 3 ) Same ( 9 ) Worse ( 2 ) No response ( 1 )

16. Overall, will development be positive, negative or neutral in its effects on you?

Positive ( 6 ) Neutral ( 7 ) Negative ( 2 ) No response ( 0 )



17 - 18. Anything to add?

Need to reclaim land	( 0 )	Need to reserve part of	
Need to enforce pollution		energy produced for	
controls & reclamation	( 0 )	community	( 0 )
Include all parts of		Need to insure that Indians	
community in planning	( 1 )	benefit	( 0 )
Need to enforce planning		Should relax environmental	
controls	( 0 )	regulations	( 0 )
Small businesses need help	( 0 )	Other	( 0 )
Need to resolve race			
relations	( 0 )		





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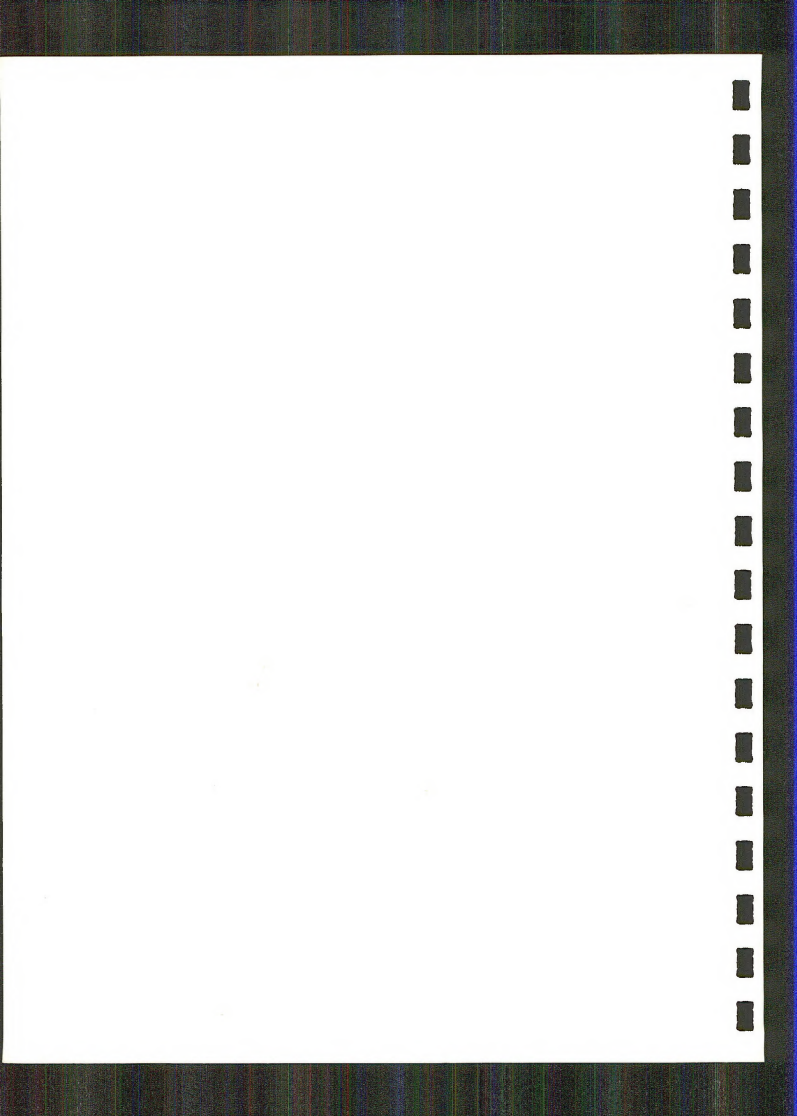
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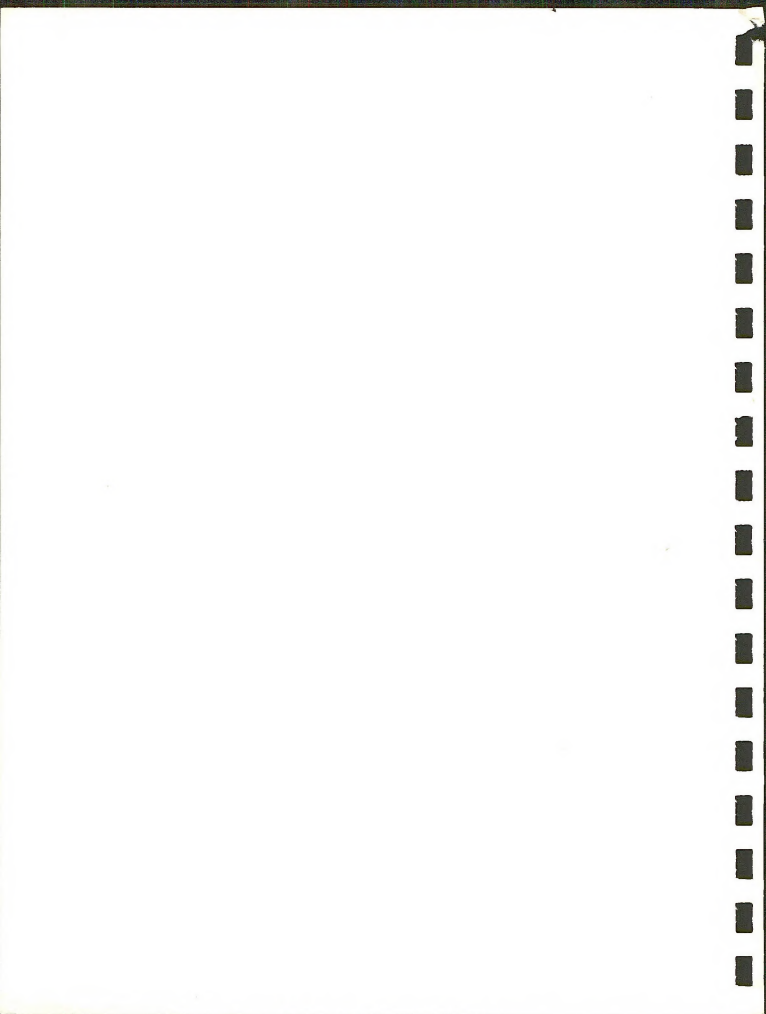




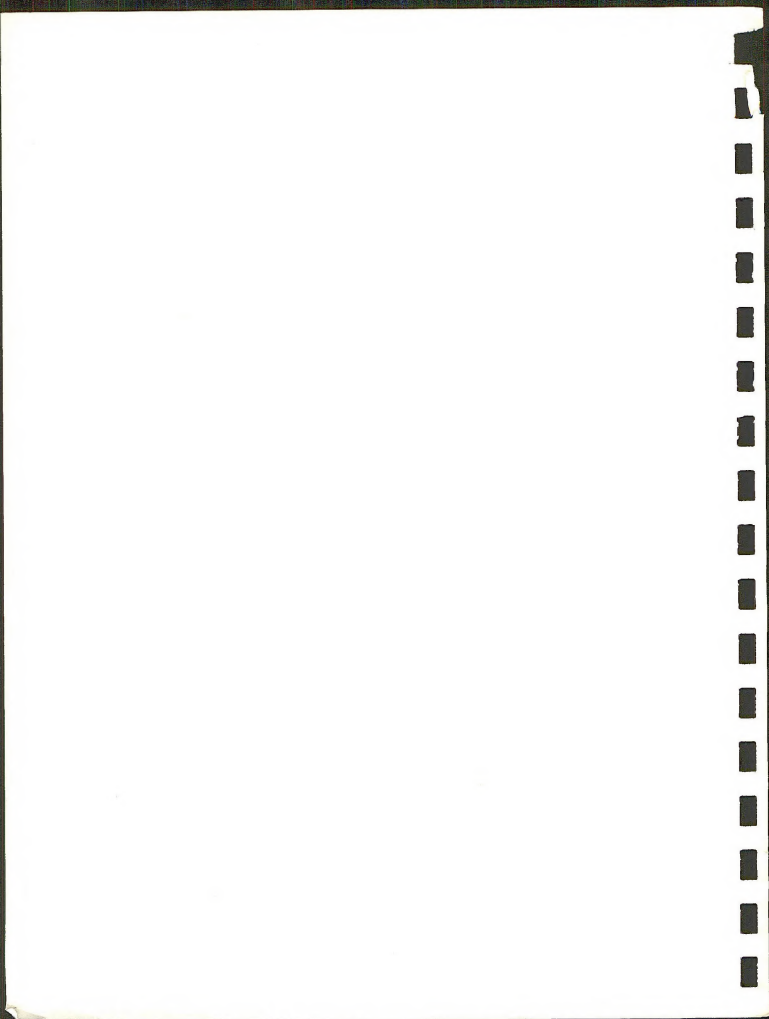
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